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ABSTRACT

This report invites examination of what the schoolhouse is and what it can be -- an instrument to equip young people to cope with an increasingly complex world, enable them to contribute to the common good, and help them find joy in their own existence. The first section discusses traditional school design and how the knowledge explosion has made the structure and the organization of the school obsolete. The next section considers the values and purposes that an educational facility design should support. The idea of dynamic management of the school environment is proposed in the open space concept, as well as the kind of planning necessary for the successful utilization of open space schools. The concluding section discusses planning procedures for a live environment. (Photographs may reproduce poorly.) (Author/MLF)

High School: The Process and the Place

That Territorial Feeling
Old Culture or New Culture
Privacy vs. Involvement
Geometry vs. Humanism
Child Place or Adult Place
Space That Breathes
The Additive Environment
The Sitting Business
Grace With Change
To Be Forgiving
The Social Arena

That Territorial Feeling
Old Culture or New Culture
Privacy vs. Involvement
Geometry vs. Humanism
Child Place or Adult Place

A Report from Educational Facilities Laboratories

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High School:

The Process and the Place

by Robert Propst

edited by Ruth Weinstock

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EFL A Report from Educational Facilities Laboratories

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Foreword

Schoolhouses must operate on two intersecting planes of reality. The first, quite simply, is that a schoolhouse is a building. It is a structure designed to provide shelter from the elements where people can assemble to carry on the business of teaching and learning. Its skeleton, mechanical systems, its spaces, parts, and pieces must fit together in such a way as to facilitate that business. It must function efficiently, effectively, and with economy for the taxpayer.

Then there is the other reality. This one has little to do with the technology of the components or the costs per square foot. It has to do, rather, with the "feeling" of the schoolhouse—with the trust or lack of it, that hangs in the air; with the way it conveys respect for its occupants, or fails to; with the warmth or chill, the lights, shadows, and textures that inform the matrix in which learning takes root.

This report deals with both these aspects of the schoolhouse. It is a "how-to-feel-about-it" as well as a "how-to-do-it" book. Its principles apply to schools of all levels, but they are directed here chiefly to the secondary school—that beleaguered sector of the system where environmental failure and human failure have become so entwined.

To the extent that the social and behavioral influences of the physical setting are something of a departure for EFL reports, they are prompted by several considerations. Drastic changes in the social patterns and life styles outside schoolhouse walls call for a rethinking of the environmental and stylistic modes that prevail within them. Not the least of these social shifts is a new kind of high school population that matures earlier, demanding a stronger voice in its own destiny. Moreover, new materials, equipment, and systems are at hand, already providing the means for greater independence in learning.

In addition, in recent years a newly developing field of environmental management has emerged—a field whose concepts apply to all dynamic organizations, be they offices, factories, hospitals, or schools. While its concepts have become operational in other sectors, they are unfamiliar to the education community, and it is timely that they be introduced in that quarter.

America is a plural society. Its schoolhouses naturally reflect the variant aspirations (and the means) of the communities they serve. In some communities there may be little interest, even impatience, with the subtleties that reach beyond the sheer physical structure. But we submit that, long after the chemical valences or theorems of geometry are forgotten, the impressions and experiences of the world in which they were learned remain to vitally affect the way we perceive ourselves and the universe. In the poetic metaphor of G. Stanley Hall, "Intellect is but a speck on the sea of emotion."

Readers seeking a single architectural solution will not find it here. No such model would be appropriate in a culture made up of diverse subcultures. But it is hoped that the principles explored will be applied by citizens in their own communities to create schoolhouses, particularly high schools, that are more responsive to the contemporary needs of the young; schoolhouses that are more sensitive, humane, more supportive of learning and growth.

Educational Facilities Laboratories

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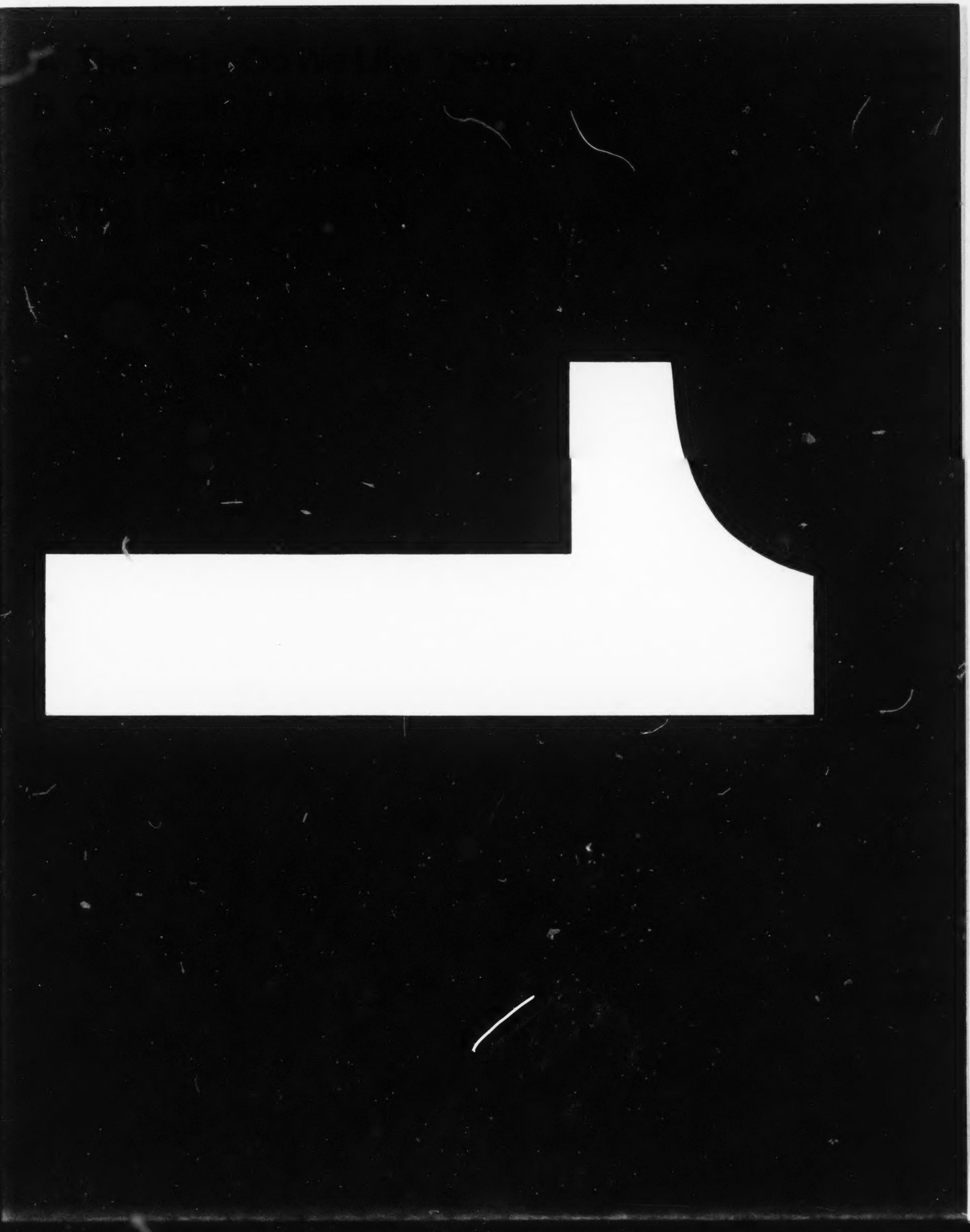
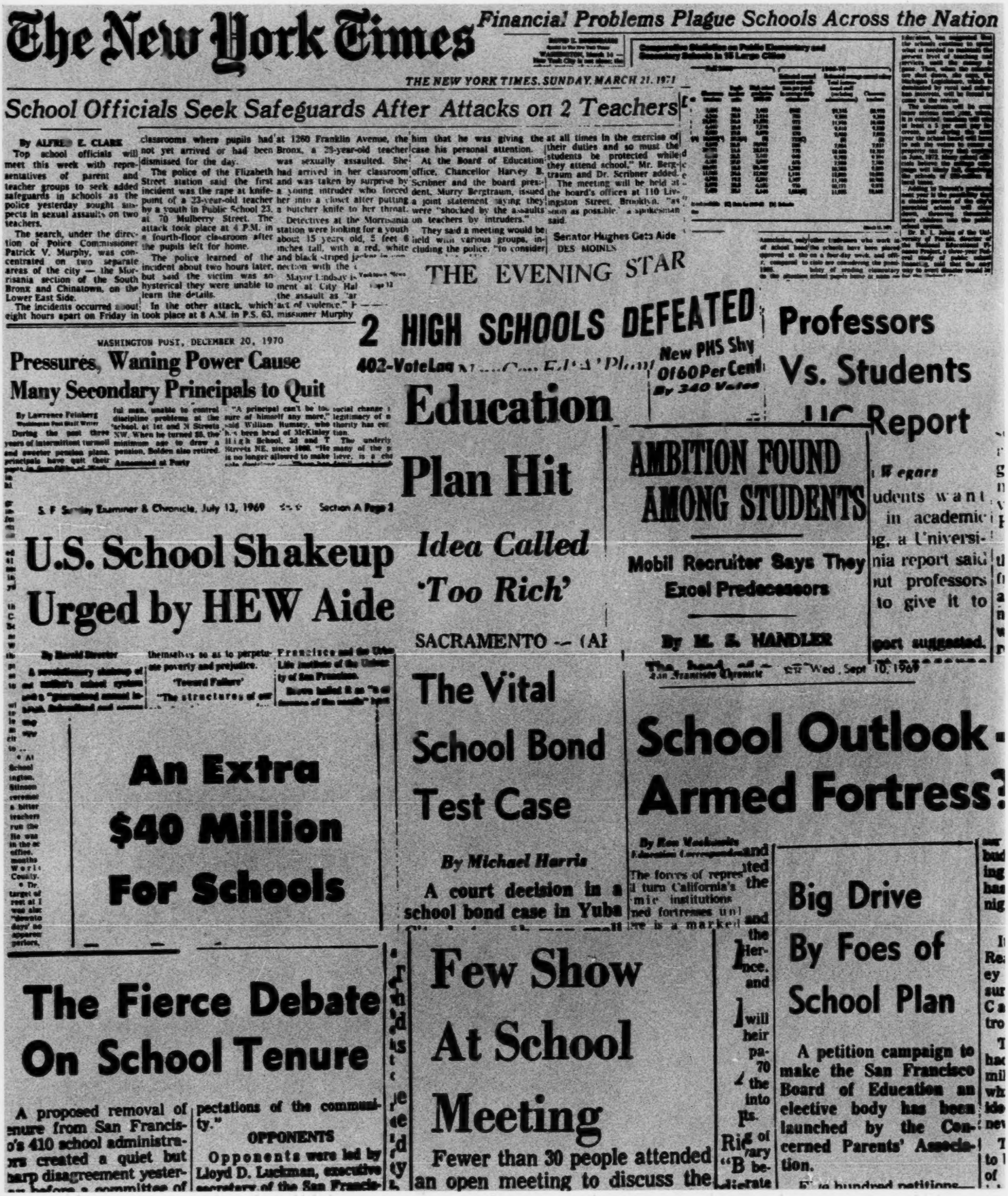




The New York Times

Financial Problems Plague Schools Across the Nation

THE NEW YORK TIMES, SUNDAY, MARCH 21, 1971

School Officials Seek Safeguards After Attacks on 2 Teachers

By ALFRED E. CLARK

Top school officials will meet this week with representatives of parent and teacher groups to seek added safeguards in schools as the police yesterday sought suspects in sexual assaults on two teachers.

The search, under the direction of Police Commissioner Patrick V. Murphy, was concentrated on two separate areas of the city — the Morrisania section of the South Bronx and Chinatown, on the Lower East Side.

The incidents occurred about eight hours apart on Friday in classrooms where pupils had not yet arrived or had been dismissed for the day.

The police of the Elizabeth Street station said the first incident was the rape at knifepoint of a 23-year-old teacher by a youth in Public School 23, at 70 Mulberry Street. The attack took place at 4 P.M. in a fourth-floor classroom after the pupils left for home.

The police learned of the incident about two hours later, but said the victim was so hysterical they were unable to learn the details.

In the other attack, which took place at 8 A.M. in P.S. 63, at 1260 Franklin Avenue, the Bronx, a 23-year-old teacher was sexually assaulted. She had arrived in her classroom and was taken by surprise by a young intruder who forced her into a closet after putting a butcher knife to her throat.

Detectives at the Morrisania station were looking for a youth about 15 years old, 5 feet 6 inches tall, with a red, white and black striped jacket in connection with the

Mayor Lindsay issued a statement at City Hall describing the assault as "an act of violence." Police Commissioner Murphy told him that he was giving the case his personal attention.

At the Board of Education office, Chancellor Harvey B. Scribner and the board president, Murry Bergtraum, issued a joint statement saying they were "shocked by the assaults on teachers by intruders."

They said a meeting would be held with various groups, including the police, "to consider ... at all times in the exercise of their duties and so must the students be protected while they attend school," Mr. Bergtraum and Dr. Scribner added.

The meeting will be held at the board's offices at 110 Livingston Street, Brooklyn, "as soon as possible," a spokesman said.

Senator Hughes Gets Aide

DES MOINES

WASHINGTON POST, DECEMBER 20, 1970

Pressures, Waning Power Cause Many Secondary Principals to Quit

By Lawrence Feinberg

Washington Post Staff Writer

During the past three years of intermittent turmoil and sweeter pension plans, principals have quit their posts ...

ful man, unable to control discipline problems at the school, at 1st and N Streets NW. When he turned 55, the minimum age to draw a pension, Bolden also retired.

Announced at Party

"A principal can't be too sure of himself any more," said William Rumsey, who has been head of McKinley High School, 2d and T Streets NE, since 1966. "He is no longer allowed to make ...

THE EVENING STAR

2 HIGH SCHOOLS DEFEATED

402-Vote Lag

New PHS Shy Of 60 Per Cent By 340 Votes

Professors Vs. Students

UC Report

... students want ... in academic ... a University of California report said ... but professors ... to give it to ... report suggested.

S. F. Sunday Examiner & Chronicle, July 13, 1969 Section A Page 3

U.S. School Shakeup Urged by HEW Aide

themselves so as to perpetuate poverty and prejudice.

'Toward Failure'

"The structures of our ...

Francisco and the Urban Life Institute of the University of San Francisco.

Education Plan Hit

Idea Called 'Too Rich'

SACRAMENTO — (AP)

AMBITION FOUND AMONG STUDENTS

Mobil Recruiter Says They Excel Predecessors

By M. S. HANDLER

An Extra $40 Million For Schools

The Vital School Bond Test Case

By Michael Harris

A court decision in a school bond case in Yuba ...

San Francisco Chronicle Wed., Sept. 10, 1969

School Outlook — Armed Fortress?

The forces of repression ... turn California's academic institutions ... armed fortresses unless there is a marked ...

The Fierce Debate On School Tenure

A proposed removal of tenure from San Francisco's 410 school administrators created a quiet but sharp disagreement yesterday before a committee of ...

pectations of the community."

OPPONENTS

Opponents were led by Lloyd D. Luckman, executive secretary of the San Francisco ...

Few Show At School Meeting

Fewer than 30 people attended an open meeting to discuss the ...

Big Drive By Foes of School Plan

A petition campaign to make the San Francisco Board of Education an elective body has been launched by the Concerned Parents' Association.

A The Test-Do We Like Them?

Because adults take the schools so much for granted, they fail to appreciate what grim, joyless places most American schools are, how oppressive and petty are the rules by which they are governed, how intellectually sterile and esthetically barren the atmosphere...

Charles Silberman
Crisis in the Classroom

Less than half the dollars requested for school construction in 1969 and 1970 were approved by voters, according to *School Management*. The magazine further reports that this marks the first time on record that approvals ever slipped under the 50% mark. Just five years earlier, in 1965, nearly 80% was approved.

Do we like our schools?
For a long time our institutionalized, reflex response to this question has been that all sensible, responsible people like schools.

But now liking them is becoming more difficult. The noise and controversy surrounding the schools speaks for the growing dissatisfaction, if not disenchantment, with them.

In a time marked by social crisis, when old assumptions are put to new tests and functional agreement seems hardly possible, it is not surprising that our schools are an issue in the discord. For life's aspirations come in the guise of children, says the poet Rabindranath Tagore—and schools and children are inseparable.

But deep beneath the layers of discord, there are, at the least, some basic goals for our schools on which there is agreement. In essence, all of us want to equip our young with the cope-ability to live in an increasingly complex world, to enable them to contribute to the common good, and to find joy in their own existence.

The intent of this book is to invite examination of the schoolhouse itself—what it is and what it can be—as an instrument of that common purpose. To some, it will seem that the building—the *place*—the environment of education—is peripheral to the central issue: education itself. But the behavioral sciences, and life itself, provide ample evidence that learning and growth are deeply affected by the environment in which they take place. Viewed in that light, the content of a child's education is made up of everything that happens to him from the moment he enters the schoolhouse to the moment he leaves. Put another way by Jerome Bruner, "The process and the goal of education are one and the same thing."

THE HOPE OF OUR COUNTRY

B Our Facility Heritage

B1 A School Is A School

Until recently, immense respect for education has caused us to accept with too little questioning the facility forms of the past. Where did they come from? Have they evolved over the years to a sacred conclusion too precious to challenge seriously?

> **Oh, for the good old days when we were all so unhappy.**
>
> **French proverb**

What we have, in fact, is a 170-year-old model with a fitful history. In 1806, the English Lancastrian system of batch-process education was introduced in America. The first fully graded public school was introduced in Boston in 1848 with the Quincy Grammar School, a school still in use. A batch of students, fastened to a teacher, in a box, established itself as the norm for the next hundred years, and the configuration of school buildings became set in a rigid mold that is now as familiar and American as Thanksgiving turkey. Ask almost any child to draw a plan of a school and he will draw a large box around a series of smaller, equal-size boxes, set side by side.

> **We are no longer dealing primarily with the vertical transmission of the tried and true by the old, mature, and experienced teacher to the young, immature, and inexperienced pupil. That was the system of education developed in a stable, slowly changing culture. In a world of rapid change . . . what is needed and what we are already moving toward is . . . the lateral transmission of what has just been discovered, invented, created, manufactured, or marketed. . . . The man who teaches another the new math or the use of a newly invented tool is not sharing knowledge he acquired years ago. He learned what was new yesterday, and his pupil must learn it today.**
>
> **The whole teaching-and-learning continuum, which once was tied in an orderly way to the passing of generations and the growth of the child into a man—this whole process has exploded in our faces.**
>
> **Margaret Mead, "Why is Education Obsolescent?"**
> ***Harvard Business Review***

For a long time, the repetition of the boxes was not without logic. Their uniform size spaces provided an efficient way of sorting people into uniform size groups according to age, grade, or some other fixed criteria. A group of 25-30 pupils constituted a class. The entire class was instructed in the same way by an omniscient lady deemed to be uniformly able in all subjects. She talked while the children sat and listened. And under the circumstances, the physical arrangements were functional.

But circumstances *outside* the schoolhouse which began to change with dizzying speed at about the end of World War II, have rendered them non-functional. Altering social patterns and life styles, and developments of new knowledge which turn even the experts into learners, demand fluid educational spaces capable of responding to constant change.

B Our Facility Heritage

(B1 A School Is A School)

Almost a third of the schools say they have been substantially constrained during the past five years in designing new educational programs by limitations in their physical facilities.

A Profile of the Large City High School **(Survey of 700 high schools in the 45 largest cities), NASSP, November, 1970**

Nonetheless, the unyielding classroom box, committed to everyone's sameness, and dedicated to the proposition that tomorrow will be no different from yesterday, continues to dominate the educational scene.

Perhaps it is because nostalgia for things of the past, especially those linked to our own childhood, beclouds the thinking about our present needs. It is a powerful emotional filter that tends to convert experience, no matter how inadequate, to acceptance.

B2 A Society Of Strangers And Strangeness

The only time the word "friendship" is found in architectural magazines is when it refers to the relationship between two architects. It is rarely considered when a home or public building is planned. This is an important omission since encouraging fellowship is one of the most vital functions of enclosed space.

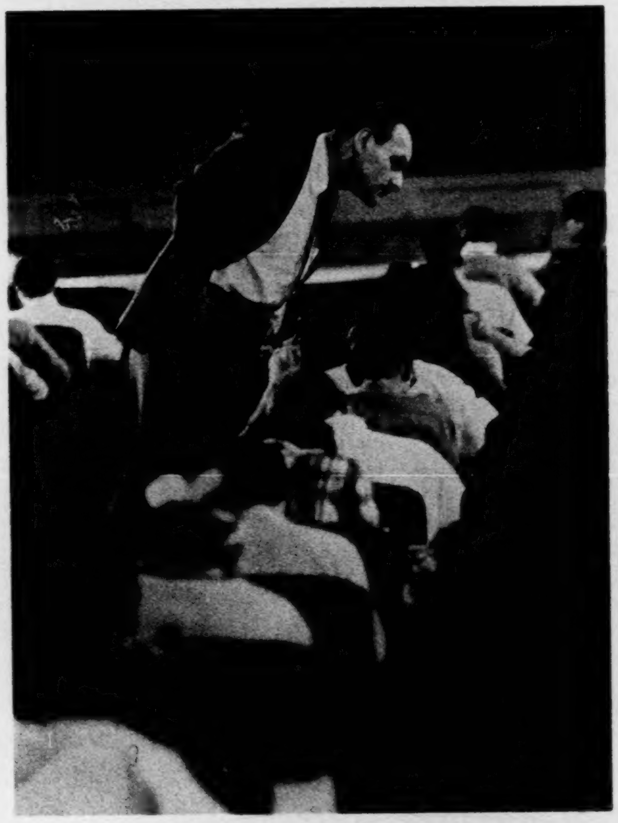
Robert Sommer,
"Design for Friendship,"
Canadian Architect

Our schools have evolved, with few exceptions, as socially unnatural places. They are notable for a curious *anti-achievement:* gathering under one roof people who spend so much time in each other's company and remain, in the end, strangers.

After thousands of hours together, literally within touching distance, teachers and students scarcely know each other. Often, students know little about their fellows—and worse, they learn little about themselves.

Although we use schools as social agents for fostering in the young a sense of self and a sense of otherness, and for learning modes of behavior, our school facilities emerge as poor physical inventions for these purposes. There are no places for natural social interaction. The nature of the places they do provide—the hallways, the classrooms with rows of chairs, the basketball gyms, the cafeterias—leave little choice for students or teachers to do other than play out prescribed roles inimical to healthy social patterns.

Who am I? Who are you? How do we relate? These are issues integral to the learning process. An environment that confuses the answers or propels people apart creates serious mischief.



THIS DOOR IS
NOT
TO BE USED AS AN
EXIT OR ENTRANCE
DETENTION WILL BE
ASSIGNED TO USERS!!

Speaking Out

By Steve Levine, 17-year-old student
Denver, Colorado

The very nature of the high school is dour and unpleasant and seems to invite destruction. Whether it is old or new, its floors are most often tiled, its halls are usually beige or pink or tan or gray or light green. It may be lined with that coldly evil ceramic brick. The cafeterias tend to bear an odor commensurate with the quality of the GSA surplus food they serve. The classrooms are arranged as tightly as a baseball diamond: one large desk facing 30 small ones. As the new protective measures are put into effect the schools begin to look and function more and more like early industrial revolution factories.

In such an atmosphere, a deeply alienated student, a student with failing grades, a student with a poor disciplinary record, a student who is bored or angry or vindictive, a student who is unpopular or inarticulate or frustrated, a student with great ambitions or a student with no ambitions at all, has little room to breathe and only the dimmest window out of which to see. He cannot effectively change the system in which he lives and he cannot leave it without jeopardizing his future.

If a school cannot be changed, it can as least be injured. Vandalism, however primitive it may seem, carries a distinct political valence. Whether it be as large an act as arson, or as small a one as the casual dismantling of a typewriter (a sort of activity carried on absent-mindedly by even good students), it is a register of dissatisfaction.

The destruction of school property, then, is a symptom of a complicated social sickness and its cure lies not in such ineffectual palliatives as dogs or alarms or guards but in a re-evaluation of educational philosophy.

Vandalism is a way of forcibly stopping the educational machine. It represents a hurt and a fury and most of all an aching loneliness and estrangement far too deep to be expunged by quick, symptomatic means. To save schools we must have a blank check and the fresh insights necessary to build visionary institutions that, simply, people will neither need to destroy nor want to destroy.

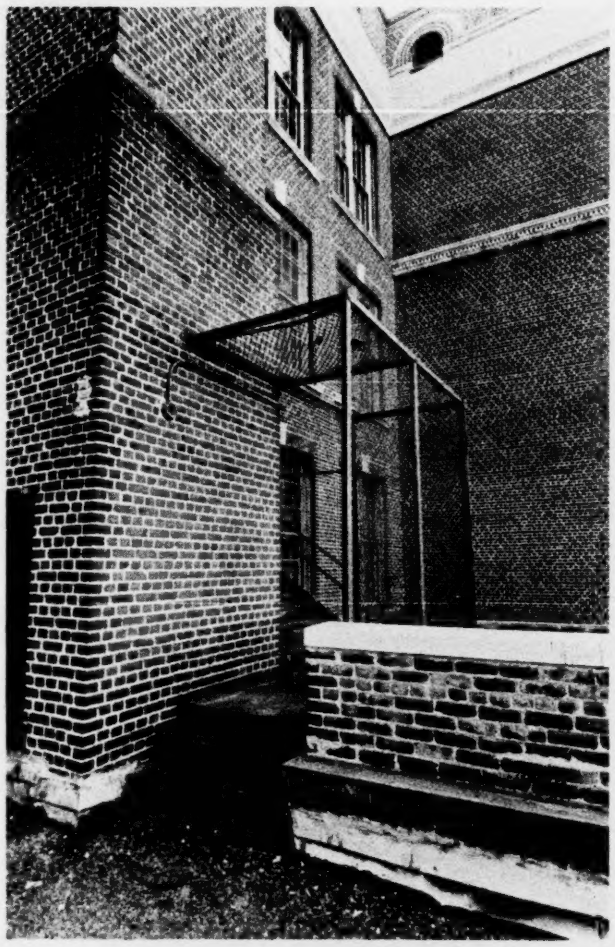
B3 The Dull Place, The Gray Life, The Big They

Schools, though they are used by everybody, appear to have been designed for nobody. We have provided an endless procession of unremarkable, sterile school buildings whose character is marked mostly by grim determination.

"Stop complaining," we say, "you're lucky to be in school at all. Schools are costly and we can do without frills. Anyway, a spartan place is better for you."

These clichés are as out of date as the boyhood of Andy Hardy. But many schools still tend to reflect this philosophy in their physical surroundings. They are stern, marshalled, and at the least, dull.

An insidious partner of these qualities is an environment that wears and grows old gracelessly. Materials and designs that mellow with use and age and stay handsome, even in their final stages, are familiar to all of us. But, misreading "wear," we have attempted to provide permanent surroundings that succeed only in providing a long, gray life during which they are disliked by everyone but are impossible to affect, correct, or remove. Compounding this feedback error, a great many elements designed for schools are, ergo, designed to be "gray" in tone and feeling.



Finally, we have the problem of the "Big They." Schools never seem to belong to us—always to others, and it is "they" who make the rules. This is an impression conveyed to all their occupants, including their administrators. Not infrequently,even the citizens who pay the bill and might wish to use the buildings for community matters regard them as remote and unavailable.

Thus, school facilities are often underused, underpossessed, detached entities.

B4 The Delivery Of Knowns—Our Resource Failure

Schools, as the public institutions responsible for transmitting knowledge, have been cast in the role of deliverers of knowns, ultimate truths, total answers. For a time in the early 1900's, they were indeed the best-organized sources of information. Now they are among the driest and least exciting sources.

In the last 20 years we have become a knowledge-based society. Vast quantities of new information are unceasingly generated, produced, and consumed. Today information abounds everywhere—in print, on film, video, and audio tape, in machines, objects, and games, in the citizens of the community. What once stood as barriers to information—cost, remoteness, exclusivity—have disappeared. Still, in their role as information merchants, schools are fusty and overprotective, doling out what is super-abundant as though it were scarce.

Moreover, though the knowledge explosion has made the "knowns" posture impossible for any school or teacher to maintain, schools still try to funnel a body of knowns through the teacher—the eternal talking machine. Beyond rendering the teacher's role implausible, it undermines his credibility. What's more, students may no longer be listening.

Every year, 400,000 books pour off presses around the world. In the sciences, there is a world wide total of 35,000 separate journals published annually, with over 1.5 million articles in them. In the United States alone, 30,000 new book titles are produced yearly—and the United States government by itself generates 100,000 reports annually, plus 450 articles, book and papers.

The Impact of Technology
on the Library Building
Educational Facilities Laboratories

My dear Miss Barrett,

I am forced to cancel the library lesson you had planned for your 3rd term students in connection with their study of mythology. Sending them here six at a time creates havoc and disorder. They have already misplaced The Golden Age of Greece and have put Bullfinch on the Zoology shelf, besides talking. Two of your students took out books indiscriminately, that had nothing to do with the assignment. I cannot allow them the facilities of the school library until they learn the proper respect for the printed page.

Sincerely,
Charlotte Wolf, Librarian

Anthony G. Oettinger,
Run, Computer, Run

KEEP AHEAD OF THE TIMES.
VOICE
Combat in the Erogenous Zone—p. 5
20¢

C The Change Forces

...we avoid facing the most vivid truth of the new age: no one will live all his life in the world into which he was born, and no one will die in the world in which he worked in his maturity.

Margaret Mead,
"Why is Education Obsolescent?"
Harvard Business Review

It is comfortable to be part of stable, permanent organizations. We prefer to have the effects of change delivered through the back door with all the wrinkles ironed out. But the impact of change now is blowing down the front door of society.

What are these change factors? What is their significance for the nature and needs of school facilities?

C1 The Change Rate Accident

Not long ago I asked a highly intelligent teenager whether she and her classmates had any heroes. I said, "Do you regard John Glenn, for example, as a hero?" (Glenn being, lest the reader has forgotten, the first American astronaut to orbit in space.) The child's response was revealing. "No", she said, "he's too old." At first I thought she regarded a man in his forties as being too old to be a hero. Soon I realized this was mistaken. What she meant was that Glenn's exploits had taken place too long ago to be of interest. (John H. Glenn's history making flight occurred in February, 1962.)

Alvin Toffler
Future Shock,

(Accident: an event that takes place without one's foresight or expectation.)

The pace of events in the last twenty years has drastically disturbed our change rate clock. So much has happened so quickly it has caused us to suffer an accident in our change digesting processes. What we normally used to do with change no longer works. New ways to accommodate and understand it are necessary.

Education, of course, is a center stage participant in this strange new accident, suffering symptomatically the discontents discussed earlier.

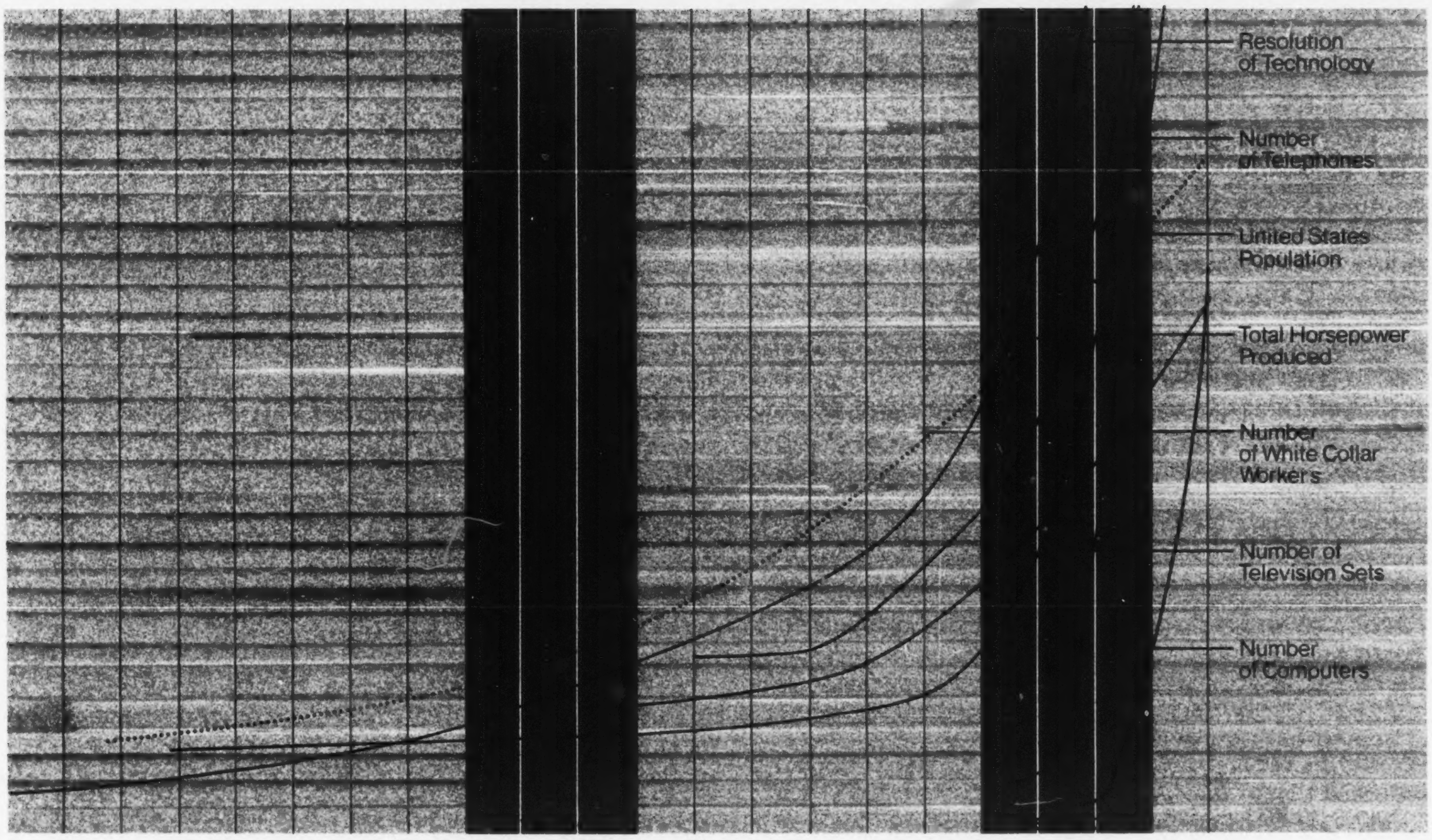
The question any responsible person asks, when confronted with a departure in the way to do something is, "Have I really discovered a better new way or am I abandoning something fundamental that man has evolved over the centuries?" As every innovator soon learns, society sticks rather closely to existing forms until new ideas demonstrate powerful validity.

(C1 The Change Rate Accident)

But now the accelerated change we are experiencing is part of a massive movement by organized society; it is not change promoted by special groups as much as it is collective conclusions generated by an information-rich population. A validity wave, if you will, whose ripples in education can be seen in the alternatives to the traditional school model that are currently taking shape.

Change Rate Chart

Our ancestors could deal with change as an evolutionary factor. Change could be digested in small steps or ignored for a working lifetime. Today it is the dominating reality; our new natural state of affairs.



Note: The above chart, and some of the terminology in this publication, are adapted from a previous book by the author. *The Office: A Facility Based On Change.*

C2 The Journey From X To Y

In 1960, the late Douglas McGregor, social psychologist at the Massachusetts Institute of Technology, introduced two analyses of organizational behavior which he labeled Theory X and Theory Y.

Theories X and Y offer a contrast in organizational modes between old or "reductive" and new, so-called "developmental" concepts. Broadly translated, these might be described as the authoritarian style versus the participatory style. Reductive Theory X, the old mode, considers the process of ordering and forbidding as a means to insure performance. It holds that people avoid responsibility and therefore must be directed and told what to do. Independence is discouraged and mistakes call for penalties.

In contrast, Developmental Theory Y assumes it is natural for people to seek responsibility and that they enjoy it. Individuals at any level need challenge and encouragement to reach their ultimate potential. Everyone needs to participate in the establishment of goals and objectives for a sense of purpose, for a sense of where they are going and why.

For the education community, McGregor's work is not without precedent. As far back as the 4th Century B.C., Plato said, "Knowledge which is acquired under compulsion obtains no hold on the mind." This theme has been reiterated in a variety of ways up through history, more recently by such educators as Dewey, Kilpatrick, A. S. Neill, and others.

Traditionally, however, our schools have tended to relegate Theory Y notions to the realm of "educational philosophy." Only rarely have they been put into practice.

But now they are gaining a foothold in the education world as a result of their acceptance by powerful outside sources—the business community and society at large. McGregor's work has spread widely, defining what is a major shift in the way we expect organiza-

The graduating engineering students at Princeton, not known for notorious liberalism, wrote to every company in the United States—they wrote to David Rockefeller at Chase, they wrote to Du Pont, and said, "We, the engineering graduating class of 1969 at Princeton University, do not believe that engineering is the mechanical application of technical expertise, but rather believe that management is an exercise in compassionate judgment. Therefore, we want to know and demand to know what your company is doing to help America over this present social crisis. And, with your permission, we will place your response in our file." These young men did not go to work for any company that did not have a social program—for hiring blacks, for training people.

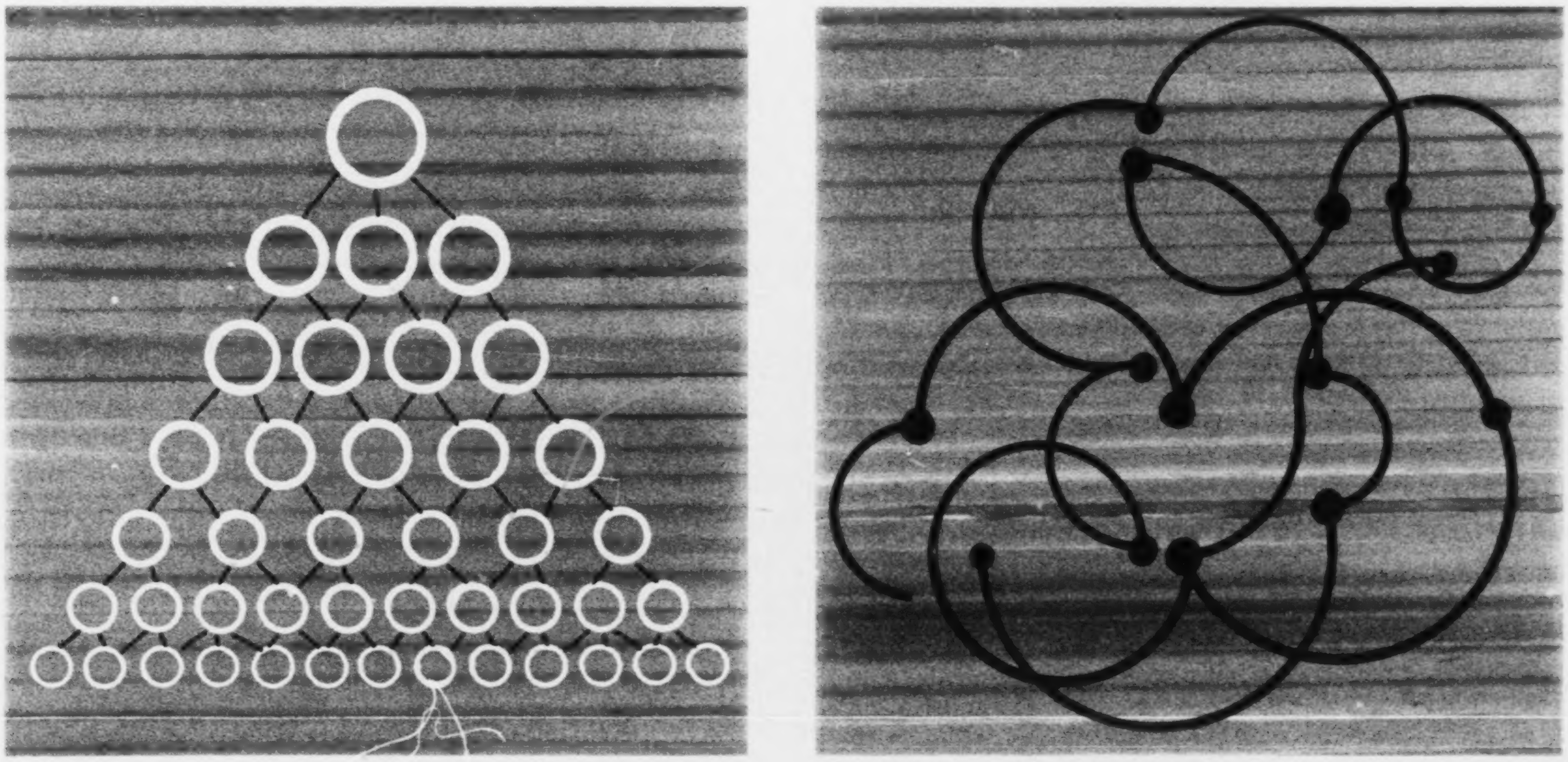
Mortimer Fineberg
"New Faces of the Office Force in the '70's,"
The Office in the '70's

tional life to be conducted. The behavioral scientists have gained popular favor and their discoveries are becoming part of public understanding. We are learning how we learn, how we behave in groups large and small, how we communicate nonverbally. Far from being dry and academic, the subject appeals to all of us (witness the popular interest in sensitivity training, T groups, encounter sessions, role playing, and in books such as The Naked Ape and Body Language).

As an outgrowth of all this, we find our Theory Y inclinations surfacing to challenge the authoritarian modes in education. We expect, even as children, to be treated as individuals, unique in our potential and our capacity to contribute.

Theory Y has developed into a powerful social conclusion which is an important change factor beginning to influence the way we structure the organization of our schools.

A contrast in styles. Organizational structure in schools, as in other social bodies, is shifting from X to Y.



Theory X. *Theory Y.*

C3 Learning About How Johnny Learns

Ideas are rarely exclusive property—especially an idea whose time has come. When conditions are ripe for a new invention or discovery, there are simultaneous and parallel activities directed toward it from many quarters.

Thus, while Douglas McGregor was working on his own theories of organizational behavior as applied to the business world, learning theoreticians and educators were at work on similar matters in their own backyard.

Now, the results of their work on how Johnny learns—and may best be taught—have become a force that is changing the very shape of the schoolhouse itself. It is removing the walls around those old classroom boxes, freeing Johnny, his group, and his teacher, from the lock-up with each other.

That work, representing the best wisdom in the state of the pedagogical art, asserts that quality education means reckoning with peoples' differences. It points to the diverse and individual ways children learn and teachers teach. It holds that people learn best through discovery and exploration, not by being lectured to. It views communication with other children, as well as adults, as a prime ingredient of growth. And it sees learning as a mosaic pattern made up of fragments of information from numberless sources, rather than as an unbroken linear development.

Putting these concepts into practice means a considerable turn-around in the way we have traditionally organized our schools. For example, it means the elimination of grades and the mixing of children so the young may learn from the older and the older from teaching the young. It means allowing children to work alone and together in different size groups, for varying amounts of time, depending upon the nature of their work. It means access to a great range of media, materials, and equipment, for self-instruction. And it encourages teachers to join together in teams so their own uneven talents can be exploited and their time more effectively engaged.

Clearly, such arrangements require a high degree of movement, interaction, and communication. Classroom boxes were never intended for such. They were designed for uniformity not diversity, for a static process, not a fluid one that may shift unpredictably from hour to hour or day to day.

Thus it is that in some schoolhouses the walls that define the boxes are tumbling down. Some schools use movable walls to accommodate changing programs. Others have discovered that if movable walls are good, no walls at all are even better. Whichever one, the thrust is toward buildings that will get out of the way and permit us to practice the best that is known. And out of all of it is slowly emerging the "open plan school", sometimes called the "school without walls"—the first major change in the design of schoolhouses for more than a hundred years.

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C4 The Information Territories

4.1 Outside Competition For The Mind

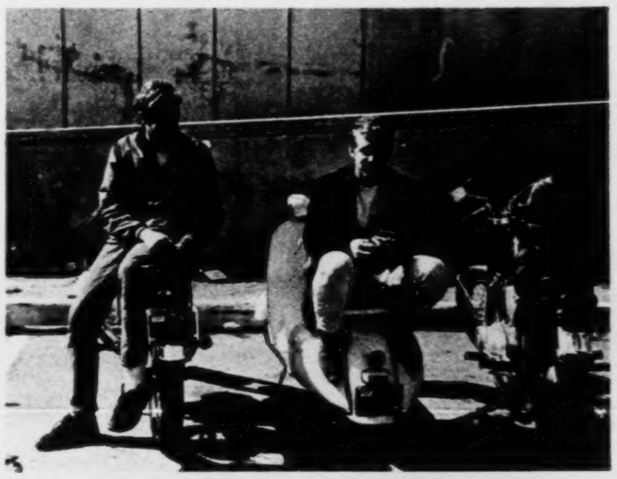
Today's kids have watched an average of 15,000 hours of TV by the time they finish high school (compared with 11,000 hours spent in classrooms).

President Nixon

Time collapsed—and the horizon disappeared. Unlike his forebears, whose horizon was the edge of the farm property, or end of a village street, the TV child saw events thousands of miles away as if they were only next door. In most cases he grew up knowing (by sight and sound) a presidential candidate better than the town mayor. Provincialism disappeared, his community became the world, and when this happened, he had no real reason to respect local authority or that of his parents.

He walked out of the living room filled with miracles and found himself in a world where antiquated bureaucracies slowly pushed pieces of paper around. He knew what he wanted. He wanted miracles. And he wanted them now.

Don Fabun, "A Dimension of Z," ***Kaiser News***



Among the forces for change in our schools is the fact that educational institutions are no longer the dominant mind-forming enterprises in our society. Schools are in a tough rivalry with other sources that also have a stake in formulating our thinking. Competition for the mind is not in itself a new phenomenon, but what is new is the efficiency and pervasiveness of the competition.

What makes the efficiency factor serious is that, for the first time in man's history, "knowing" cannot be achieved by methodically plugging along trying to deal with the gigantic body of information extant.

The real force for change is not the huge scale or diversity of information, it is a non-establishment perception of how to use this vast resource. This is the domain of a new breed, the *information territorialists,* who stake out claims in a new kind of turf.

4.2 The New Turf

The only time my education was interrupted was when I went to school.

George Bernard Shaw

Michigan State's Professor Jennings believes that the modern fast-rising executive is likely to be strong in a very special kind of mental ability that he calls "maze-brightness." The maze-bright man knows his way around structures. He quickly perceives passages that lead nowhere. He knows how to adjust quickly to strange terrain, and how to get things done through and around channels. In short, he is at home in a multi-layered hierarchy. The growing complexity of modern corporate structures, he feels, is tending to make this a crucial skill for the man who wants to advance. When Robert McNamara went from Ford to running the fantastically complex and scrambled U.S. Department of Defense (with an annual budget of nearly 10 times Ford's) he looked over the situation for a few weeks and then defined 131 major "tasks" or problems that needed analysis and solving. Within a year, Newsweek reported 112 of these tasks had been completed. And in the process, the Department was transformed.

Vance Packard,
How To Succeed in Business
By Really Trying

An information territorialist is one who is pay-dirt oriented. His thrust is to find relevant experiences that telegraph information.

The student as an information territorialist may decide (and his parents are likely to agree) that two weeks of travel offers a better payoff than two weeks in school. The explosion in travel by the young is a discovery that mobility is part of our information turf.

The information territorialist may not come to school at all. Among the reasons many students drop out, whether poor or affluent, is their perception that school is information-poor turf compared to the richness and vitality of "real life" or "the street."

One healthy reaction is the tendency for some schools to go where the action is. The super insight of Philadelphia's Parkway School or Chicago's Metro High School is their recognition that school activity can go where the experience is fresh and real.

A student as information territorialist preempts channels. He may insist on talking to people first hand. He is not intimidated by the long-distance telephone and regards its use as a piece of turf of high potential. Teachers and parents may not be attuned to this, but he may well see that a three-dollar phone call is a better buy all the way around than a ten-day, information-poor trip in a classroom.

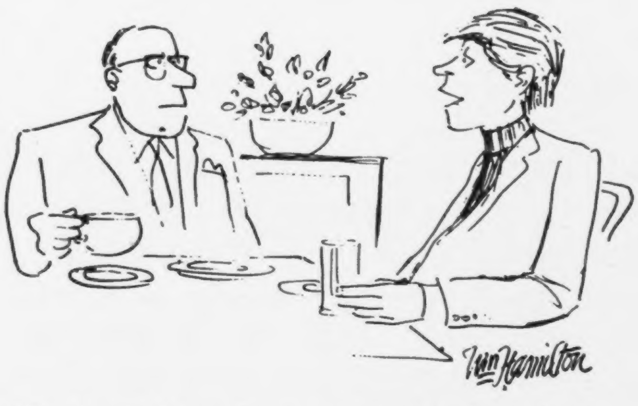
Gatwick Airport
THE BOSTON STRANGLER
NAKED EVIL

4.3 Time Is Turf

Part of this territorialist's awareness is that time is turf. As an elementary school pupil he may already perceive that his time is being wasted in busywork activities. He compares this to the high-quality bits of experience he has already had. By the time he reaches middle or high school he becomes increasingly restless with the school as information territory.

This restless appetite for quality-packed experience is evident, in these less polite but more candid times, in the way people leave in the middle of a slow lecture or a movie or football game. Even events theatrically designed to hold an audience must watch the pacing. Other channels beckon.

A good territorialist may be able to handle several channels at the same time. Witness the way today's youngsters do their homework to the blaring of rock, or read, watch television, and eat simultaneously.



"Dad, could I have twenty thousand dollars to make a film?"

Drawing by Wm. Hamilton; © 1967 The New Yorker Magazine, Inc.

4.4 Information As Property

Finally, there is a demand for ownership of information. Access to it seems our right. We want to use it, formulate it into intelligence structures, keep it, or discard it at will. Even small children do so and by the time students graduate from high school they have, on their own, sat through countless movies, possessed record collections and tape recorders, consumed and discarded paperbooks, bought and traded posters for their rooms, snapped and processed hundreds of pictures.

Schools must recognize that students are not passive receivers whose choices are limited to what the school dispenses. They are activists with their own sense of what counts and will spend their own time, energy, and money to obtain this commodity of synthetic experience—information.

D The Facility Conflicts

School facilities are expressions of our attitudes and values. Why is it that, in spite of great expenditure and effort, our schools continue to be places that thwart and deny natural use?

Perhaps it is because, in the clean world of preplanning and design, we are drawn to concepts of perfection. But perfection exists only when we design for hypothetically static behavior. More realistically (and more humanly) we can only design for the natural conflicts that reside in human needs and desires.

What are these conflicts?

D1 Privacy Versus Involvement

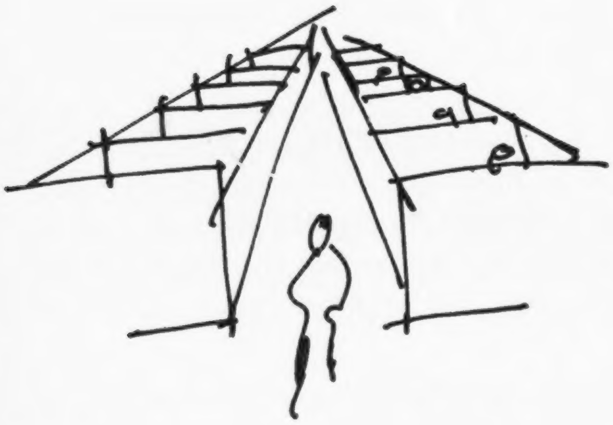
We all have a yo-yo feeling.

There is a conflict of desire within us that is in a constant state of adjustment. It tries to balance on one side a powerful need to participate, to be involved with others, to be part of, to belong, against an equally powerful need to be private, individually separate, to be free from group pressures, to dominate a piece of turf ourselves.

These are ambivalent desires that ebb and flow in uneven manner. In each individual they function as a system that tries to relieve excessive pressure in either direction.

The facility that ignores or fails to recognize both sides of this tension will be unsatisfactory much of the time.

D2 Geometry Versus Humanism



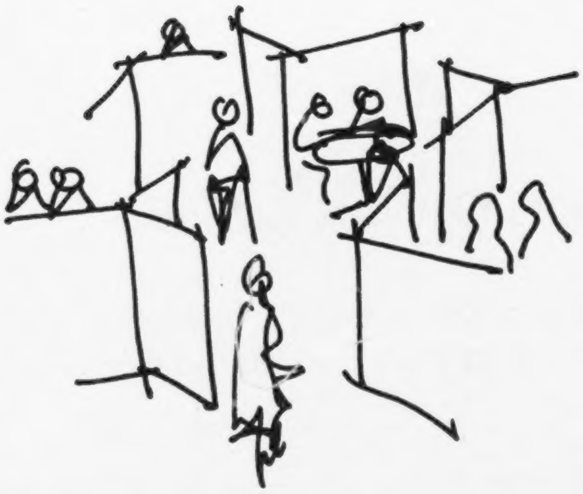
Authorities and planners visualize the chaos of large numbers of people in buildings with disorderly space. People will be confused, disoriented, lost, uncontrolled. As a result, we have an inordinate regard for method and order in space that will satisfy these important concerns. Where am I now? Which way is north? How do I get around? Where is out?

But this concern by itself can produce space which, in terms of human use, is mechanistic and robot-like, space dominated by the straight lines and acute angles of Cartesian geometry. Often it results in eggcrate uniformity which insists on predetermined patterns of use, with no give to allow for the ways people naturally array themselves in communication relationships.

Patterns of human communication follow no straight lines. They are made up of bits and pieces, episodic and varied, which call for a different kind of spatial order.

This order is based on the proximity of people who need to communicate for the work at hand though the particular work and those involved in it may shift throughout the day. It is based on their tendency to fall into groups of different sizes and configurations.

In the resolution of this conflict, spatial order is still the objective. But it must be achieved through recognition of the natural dynamic ways people use space.



D3 Child Place Or Adult Place

Although both adults and children occupy school facilities, there is some confusion as to what the facilities should reflect. Is it a childlike place? An adult place? Can they be combined?

Schools, unfortunately, have tended to be neither. Seating, of course, has been scaled down in size but a room filled with small seats fails to recognize that sitting for long periods of time is very unnatural for children—or that children themselves come in different sizes.

We can recognize on the one hand the hazard of losing childlike freshness, brightness, exuberance. On the other hand, there is the prospect of losing maturity models and having everyone, adults included, locked in juvenile modes.

The resolution of this conflict lies in the ability of schools to embrace both qualities with more forthright allowance for their differences.

D4 Old Culture Or New Culture

Perhaps schools, much like a bride's costume, need something old, something new, something borrowed, something blue.

We want them to be a bridge to the past, a preserver of the culture and a cornerstone of stability. But we also want them to be agents of change leading the charge to new frontiers.

Again we ask ourselves how school facilities should be expressed, and we have not really resolved this "go and stay" dimension.

As I visit schools these days I see 1971 architecture, 1960 pedagogy, and 1940 furniture. The latter utterly frustrates the former.

Harold B. Gores
Educational Facilities Laboratories

2

A Values In The School Environment

Every successful living environment has a conceptual structure that precedes its physical expression. This is the statement of values and purposes that a physical facility is then designed to support. In school buildings it should be an overview that links educational and human objectives with shelter and services into coherent effect.

This conceptual structure is frequently missing from our planning processes and it has caused us to build a great many educational warehouses—places to store and maintain people but certainly not places to live in or excite our desire to educate and become educated.

32/33

What are the values a schoolhouse should project? What are the principles that can guide us toward making them environments that are both humane and effective?

A1 The New Guidelines

A successful facility provides a combination of discipline and permissiveness; discipline, in that it limits and protects from chaotic, unmoderated complexity; permissive, in that it allows wide expression and re-expression for both the individual and the school.

To achieve this, there are three paramount guidelines—the ability to forgive, the ability to change with grace, and the ability to be regenerative.

1.1 *To Be Forgiving*

We must be allowed to change our minds. We have an unfortunate heritage that assumes we are in possession of some kind of super vision that can place us in a perfectly planned facility where we will live happily ever after. That has never been possible. Human organizations have always been complex and unpredictable.

The unpredictable nature of our future needs requires a *forgiving* behavior in facility design. This forgiving should not impose significant cost, delay, or frustration on the user. Our designers, manufacturers, and builders are obligated to make this a comfortable legitimate objective.

1.2 *Grace With Change*

One reason we resist change is the kind of disruption it brings to our lives. If change means a period of dust, confusion, and loss of momentum, it is understandable why the cramped old shoe is lived in too long.

When we think of frequent change, we worry about living a perpetually tentative life in jerry-built, junky facilities.

The requirement is not only to change with ease but to achieve a well-appointed, well-resolved solution—grace with change.

1.3 *To Be Regenerative*

An environment for human use must be able to renew itself.

The long lesson of history has shown that whenever we have attempted to build eternal, imperishable things, they turn out to be difficult and irrational to use —gray, hard, and repelling to people.

Wear that is expressed gracefully as things are used, and the ability to renew or replace at the right times with straightforward decision-making, are objectives to aim for when we plan facilities.

A2 The Social Arena

2.1 To Be Multidimensional

The school should do what our larger society has to do: be ready to encompass a rich diversity of behavior and cultural input. This includes our peripheral members; the handicapped, the deprived, and the brilliant. As a critical model, it should be the aim of school to keep a live exploration under way. "How big, colorful, and diverse are we?"

It bothers parents and educators that youngsters have trouble being articulate, expressive, and individually creative. But it is even more troublesome and perhaps tragic to have students emerging from our schools still inarticulate and still seeking their own identity, style, and means of expression.

All of us need a "how am I doing" reflection, but it is especially important to juveniles. Against this, we have to recognize that our present school environments are one-dimensional as a social model and unable to encompass reaction. We are allowed to peek at the script but playing the part is always for later.

This syndrome is expressed in the national cliche of asking children what they are going to be when they grow up—as if they weren't somebody and something already. How *do* we discover who we are and how we function in society? By practice.

Adolescents immersed in an automobile culture have developed cruising as a partial answer to their need for social gathering. Since it requires a slow parade pace, many have a place to display themselves and their cars; others come just for the social attraction; for many it becomes a ritual for attracting and meeting potential mates.

As the automobile has become a medium for adolescent social expression, the cruising strip has begun to fill the gap left by inadequate social institutions. It has become the social arena generated out of the need to gather. Cruising may therefore be seen as the result of the interrelationships existing among three social and cultural forces operating in the adolescent subculture: the need to gather, the impact of the automobile, and the lack of adequate institutions.

Theodore Goldberg,
"The Automobile:
A Social Institution for Adolescents,"
Environment and Behavior

The needs for safety, belongingness, love relations and for respect can be satisfied only by other people, i.e. only from outside the person. This means considerable dependence on the environment.

Abraham H. Maslow,
Toward a Psychology of Being

"Getting to know you," difficult in midst of large groups, is aided by one-to-one meeting places.

2.2 Practicing The Social Mechanics

- To meet, to practice meeting.
- To talk, to practice talking.
- To listen, to practice listening.
- To disagree, discuss, synthesize.
- To be persuasive, to develop an awareness of how we affect others.
- To explore and practice the complex ways people get along with each other and the roles we play.

The development of social skills depends, among other things, on gaining a growing network of *one-to-one* meetings. As an individual one cannot meet a crowd, an entire class, a whole school. That first step of strangers saying hello is a delicate one. It requires time and the right circumstances. A curious example is the situation on airplanes. Although it is somewhat difficult to talk sitting shoulder to shoulder, the situation and environment nevertheless are conducive to it. Two or three people are seated together. The space is friendly, the aircraft sound provides privacy. Then, there is time—first, to sit together and say nothing, but presently it becomes almost imperative that something be said. The meeting done, conversational interaction begins.

Conversational interaction itself is a matter of concern. In schools there is much talk but little dialogue.

The process tends to ask only for "answer talk." Even worse, it often sets things up so that answers must be written or X'd in multiple choice boxes. There is little format for intellectual rap sessions, for encouraging skepticism, speculation, or disagreement.

Presenting opinions, advocating views, and receiving responses firsthand is a great teacher. Seeing some approaches fail and others succeed is learning. Loudness, abrasiveness, intimidation, ruse, demonstrate that in the end they do not persuade. In a straight cause and effect relationship, students have the experience of

Do you know what a duologue is? A duologue is not a dialogue. A dialogue is a conversation. You and I have a conversation. A duologue is two television sets talking at each other. This is what most of us do in life. We're both talking, but we're completely isolated.

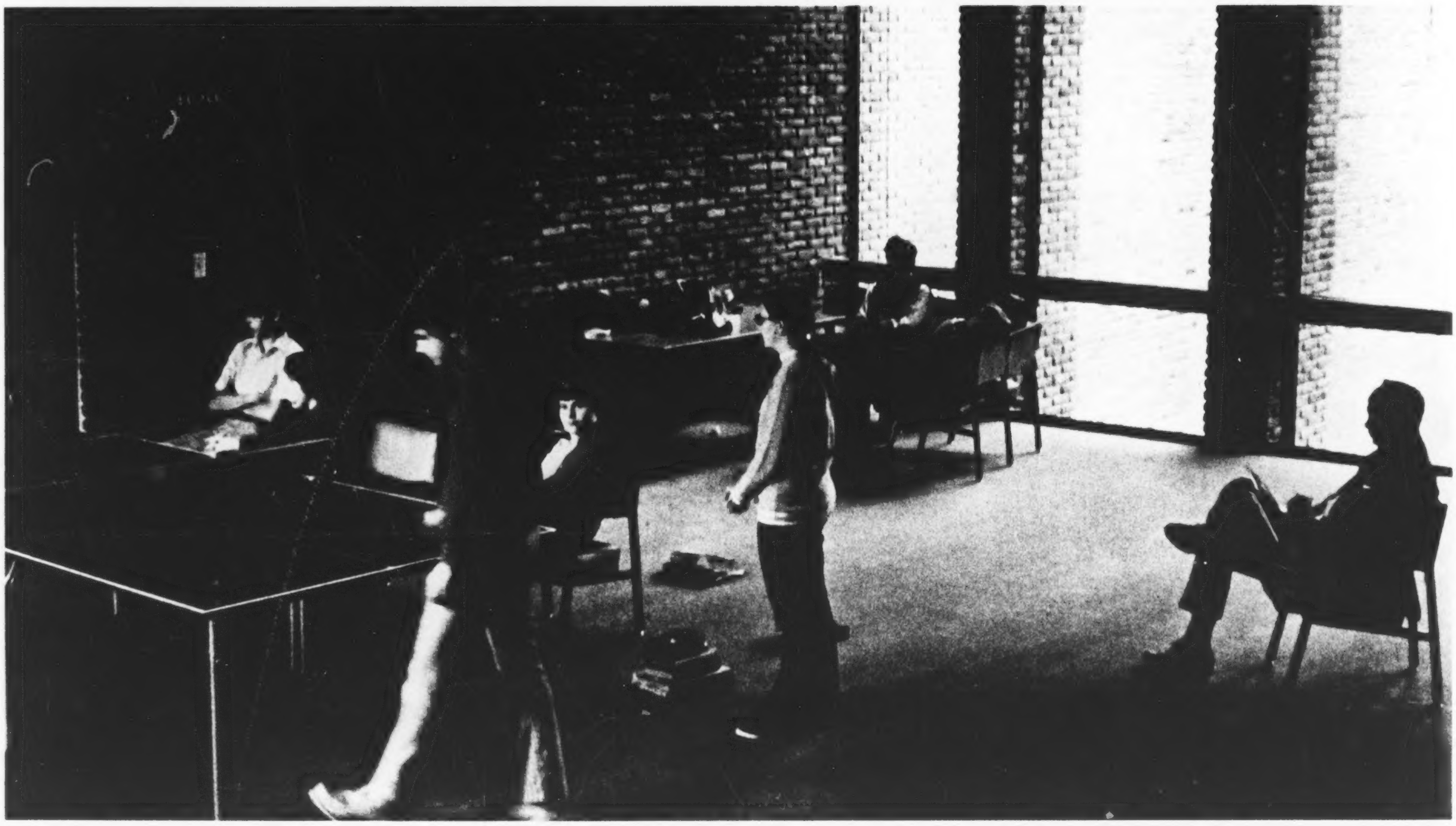
Mortimer Fineberg,
"New Faces of the Office Force in the '70's,"
The Office in the '70's

2X + 32 − 2 = 150
2X + 30 = 150
− 30
2X
X
3K + 12 + 2K + 8 = 70
3(K + K)
SP

Smaller, deformalized settings. Unconstrained atmosphere of such classrooms helps people to be themselves, to express ideas more freely.

being judged directly and by their fellows, not remotely by a teacher alone via an examination.

The familiar classroom is rarely conducive to these experiences. School design and management must provide the time, places, and circumstances for them—smaller, de-formalized settings with a mix of ages and ideally, with the adults of the community involved as well as teachers.



2.3 Play And Games

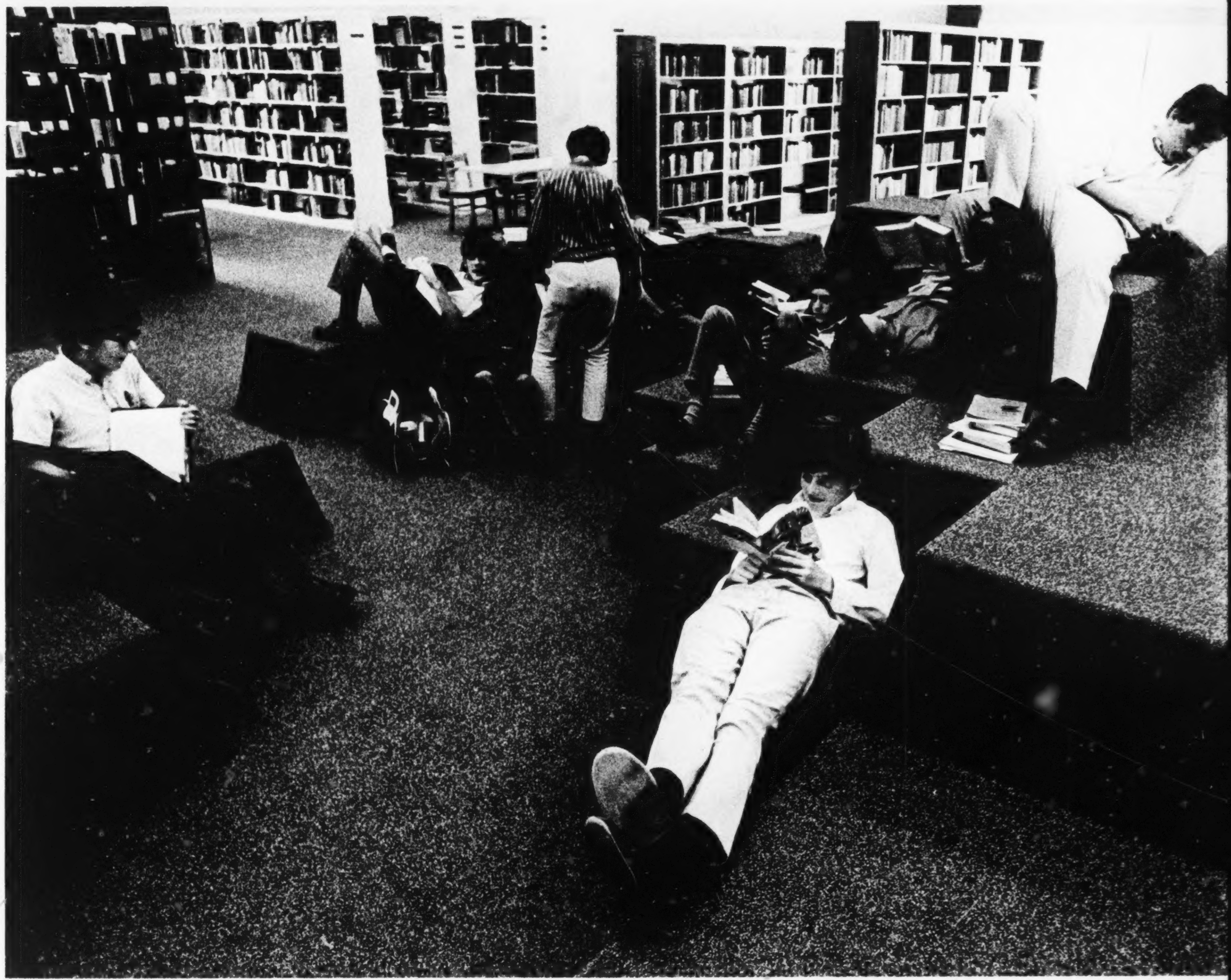
Play is older than culture, for culture, however inadequately defined, always presupposes human society, and animals have not waited for man to teach them their playing.

Bryant J. Cratty,
"Movement Behavior and Motor Learning,"
Games and play

The vehicles for practicing social, intellectual, and physical skills are play and games. At the elementary school level it is more widely accepted, though still not always implemented, that children learn through play. But in our high schools where the population consists of adolescents with more fully formed ideas and attitudes of their own, authorities tend to be so nervous about "losing control," they have forgotten what play is all about—especially improvised and naturally developed play.

Games and play, in which we pit ourselves against problems, or our peers, or simulated reality, where we learn from the contest how to lose as well as win—and develop strategies even while losing—have been rediscovered by scientists and industry as superb learning tools. But in schools, where these could be among the most natural, efficient ways to challenge and teach, they seldom occur. Even were there the inclination—or the trust—to let them happen, where in the schoolhouse could they happen?

Again, we will have to make a deliberate investment in time and place if our schools are to serve as social arenas, cause and effect places rich in feedback.



"Good vibrations" emitted by school library lead to heavy demand on its services. Inviting tone achieved here with simple, carpet-covered platforms.

A3 Tone—What Does The Facility Say

The nonverbal content of our surroundings is compelling. We act very much as we are directed by the tone and quality of our physical environment. For example, numberless parents on automobile trips have noticed that the back seats where small children can see only the backs of their parent's heads are notable fighting pits.

A school facility delivers a tonal message to its inhabitants, and this has important potential. It can, as it all too often does, present a tough, defensive "I can take anything you can hit me with" message. We should recognize that the student does indeed deliver the expected assault.

The positive potential is that the nonverbal message can deliver a civilizing effect. What kind of tonal objectives should be sought in a school facility?

- To be unselfconscious (living in a faddish public monument is not generally to our taste).
- To be human-scaled, welcoming, and approachable . . . a cold overscaled place makes us feel as though we are camping out . . . everything is out of reach and out of touch.
- To be warm, a growing place (if plants will grow and thrive, chances are it is good for humans).
- To be economic, reasonable, accountable (the hallmark of any great design is that while it does what is intended with competence, it does not use more than it needs).
- To be usable, consumable, and capable of regeneration. We have to resist the temptation to build 'touch-me-not' waiting rooms. "Use me" has to be the tonal message.

The facility designer has the responsibility to cultivate this civilizing effect in buildings. A school that is habitable and humane gains in return the moderate, happy behavior of people who like where they are.

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A4 That Territorial Feeling

Some thirty inches from my nose
The frontier of my Person goes,
And all the untilled air between
Is private pagus or demesne.
Stranger, unless with bedroom eyes
I beckon you to fraternize,
Beware of rudely crossing it:
I have no gun, but I can spit.

W. H. Auden,
"Prologue: *The Birth of Architecture*"

Schools cannot afford to lose people. You lose people when they do not have the right places to be.

The sensation of being in the right place is part of the constant human equation with our surroundings. In every circumstance, there are individual feelings and group feelings about space. The right shape, scale, and context are always sought.

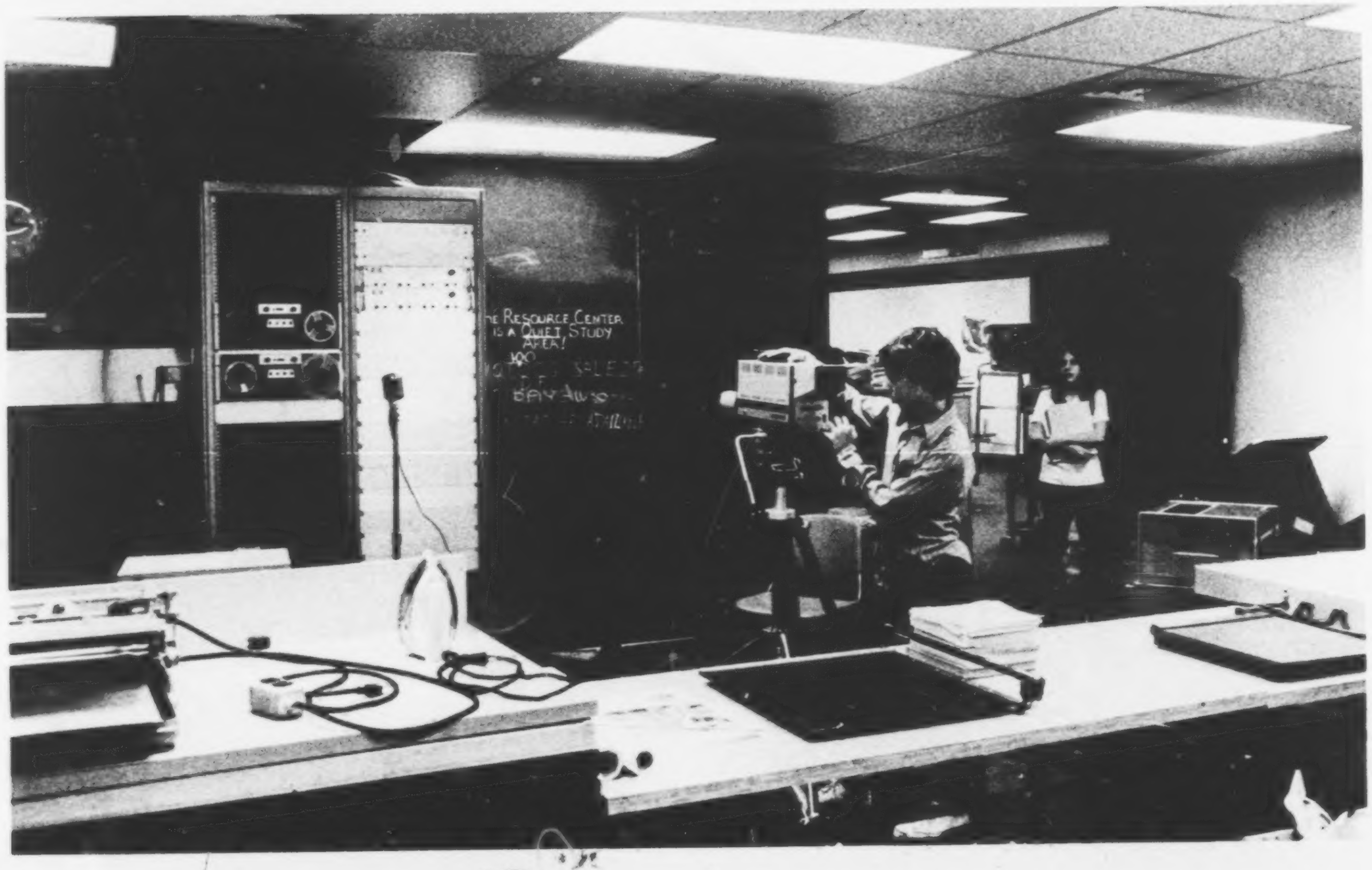
There need to be places to be:

- a single person in egocentric context
- in two's in a companion context
- in three's or more in a social group context
- in ten's to twenties in a small community context
- in the hundreds in a general society context.

Normal and desirable learning activity requires this spectrum of territorial places and there is a constant effort by school populations to seek and negotiate what is needed. But it is also quite impossible in most schools for this negotiation to succeed, and a great many people feel uncomfortable and lost too much of the time.

Especially prominent in the last category are teachers who suffer from a too-continual large-group context. They need, as do we all, a portion of their time spent privately or with colleagues. The classical situation of the classroom with the teacher's desk in front is also the classical situation in which an individual and a group are in a territorial lockup. Neither the students nor the teacher have negotiable options. This generates another common symptomatic situation—the tendency for toilet facilities to become intensely used, small-group social territories.

Spatial variation, negotiable by the user, is an essential language schools must provide.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A5 Things Management—The Resource Enterprise

> **Learning can only be done by the learner. It cannot be done by the "teacher." The teacher can only be a help or an impediment to learning.**
>
> **Peter F. Drucker,**
> ***The Age of Discontinuity***

> **Many psychologists (notably those of the Gestalt school) have stressed the importance of insight—the sudden flash of understanding often called the "aha" experience. Sudden insight may well be related to the sudden formation of associations. Indeed, a number of experimenters have found that associative learning often involves the sudden discovery of some mnemonic device for linking together two items by means of some intermediate idea. This closely resembles the process by which we solve problems.**
>
> **Irvin Rock,**
> **"Repetition and Learning,"**
> ***Scientific American***

Schools drastically underestimate the need to activate learning with things—educative artifacts, tools, exciters. Because of their absence, schools often have a vacant unreal quality. The tools that run the world are missing.

We have to recognize that those who use our schools come from a society that is accustomed to using things. We must allow for the "do" side of education as well as the "read about it" side.

More educative things can enter the school if there is a *concept of management.* What is missing is literally the format for enterprise. Schools have to get into the business of making resources available.

But isn't this what libraries do already? Couldn't they simply spread out a little? The answer lies in whether or not libraries are ready to encompass the wide range of artifacts and resource services that have become intrinsic to education.

What are some of the tools and services that should be part of school resource concepts?

First, the world of catalogs. A collection of great catalogs (usually free) is a brilliant exposition on what can be done, what things look like, how they work, and what they cost. (Remember the delights of the Sears Roebuck—or a seed catalog on a wintry night?)

Second, the world of professional journals and magazines. There is a myth that journals are interesting only to professionals. Hundreds of journals are interesting indeed to a student population wanting to know the content, activities, and dimensions of professional areas.

Third, access to tools. There is a world of tools quite different from those provided in shop and home economics courses. Especially important are the communication tools—the cameras, tape recorders, printing, and reproduction devices. There are the tools of test-

Entryway, General Resources Store

ing and analysis—cathode ray scopes, scales, calculators; tools of exploration—telescopes, charts, kits, microscopes; tools of construction and fabrication for making anything a learning situation may require. Kits are available in remarkable variety.

Fourth, the services—for lack of which schools can be notoriously difficult places to get things done. A first concern should be to help publish. This means arranging for film development, printing, binding, framing, recording, anything that would assist the development of communication skills. But the school can also function as the agency that orders things for students and teachers as a natural extension of a catalog collection.

Fifth, the school can offer cultural artifacts. Appreciation can be given a boost if the student can collect sculpture reproductions, craft items, recordings, geologic samples, models, and similar objects.

Sixth, the matter of simple supplies. Schools assume that every student has convenient places outside to get the small hardware items and bookstore supplies needed. This often is not the case. Delays and obstacles in the way of obtaining a small piece of metal or a battery, a board of lumber or roll of film, lengths of wire or a special brush, deplete time and energy better spent on the purposes for which they are needed. Enthusiasm for a project can wane with protracted delays in execution. "Ideas won't keep," said Alfred North Whitehead. "Something must be done about them."

Seventh, books can be made more easily available. Even where school libraries function busily, there is inadequate recognition of the phenomenal world of paperback books. They are possessed, marked, carried, eaten with, slept with, traded, loaned, collected, discarded, retrieved, and consumed. To participate in the paperback phenomenon requires that schools adopt the free-wheeling role of a resource dealer. It is often less costly for schools to give paperbacks away than to put them into their library processing.

(A5 Things Management – The Resource Enterprise)

"Things management" may sound complicated for a school, but need not be. If the school's clients are viewed as educational resource consumers, then "things management" may be expressed best in the form of a store—a place, and personnel, in the business of negotiating for students and teachers the things they need; a general resources store where it is possible to borrow, rent, buy, and order. A store knows how to conduct business, and it trades and deals with its customers in a way they both can afford and find interesting.

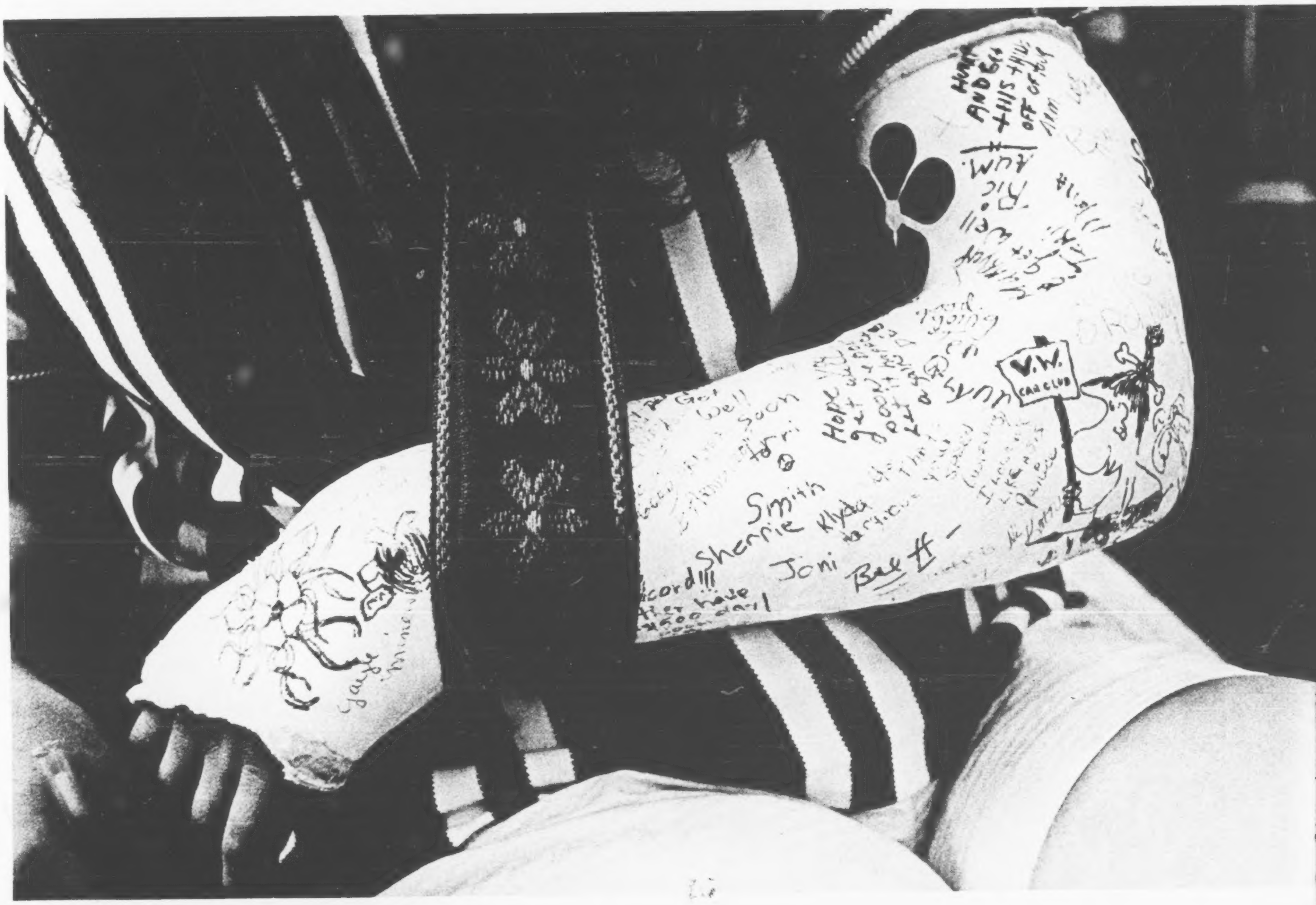
Given the competition for the minds of students, schools may succeed or fail depending on the job they do with resources.

shelter land use

General Resources Store at Clear Creek H.S., Idaho Springs, Colorado, is an intellectual bazaar. Located on busy main floor traffic path, the school-run center places knowledge and tools side by side. Its function: to excite interest and then deliver the goods—information, equipment, materials, and services—for doing something about it. The store's motto: "Use it, consume it, it's yours."

catalog file

YOUR STUDENT
JACKi L. I Love You AND THAT'S THE TRUTH GARY


AND GET THIS THING OFF OF YOUR ARM
Ric
Get Well
Soon
Hope you get well
Lynn
V.W. CAR CLUB
Smith
Sherrie
Klyda
Joni
Bal #
cord!!!

A6 The Additive Environment

A school facility that resists the application and display of the daily artifacts and statements of its students and teachers is a dead building and soon a very boring place. It is never really occupied or possessed by its users.

The ideal facility welcomes the additive desires of its users. It manages and endorses a live museum function of both formal things and personal, spontaneous statements.

A good school is in the presentation business. It encourages the staging function of learning. It is not afraid of the tentative or naive statements of young people. It accepts them with grace.

This capacity, when it is allowed, builds an identity for students and teachers. More and more of who we are, another view of ourselves and how we are doing...

Accepting this function for a building requires some rethinking by designers and architects who seem to prefer buildings that look depopulated and void of all signs of work or occupancy. There is an ingrained feeling that allowing the user to tamper with the visual effects of a building will ruin its esthetic value. The buildings in their own right have invented ways to suppress anything spontaneous in display. Excessive window areas, for example, rob interiors of surfaces needed for additive content.

But there is another side to the problem as well; that is, while the interior architecture makes no provision to *receive* display, the display materials themselves, which are mostly paper and fragile, provide no means of being mounted or hung. It is scotch tape or else, with administrators and custodians not far behind with bans and scrapers.

In normally alert subjects, it is probable that the eyes may be as much as a thousand times as effective as the ears in sweeping up information. Up to twenty feet the ear is very efficient. At about one hundred feet, one-way vocal communication is possible, at somewhat slower rate than at conversational distances, while two-way conversation is very considerably altered. Beyond this distance, the auditory cues with which man works begin to break down rapidly.

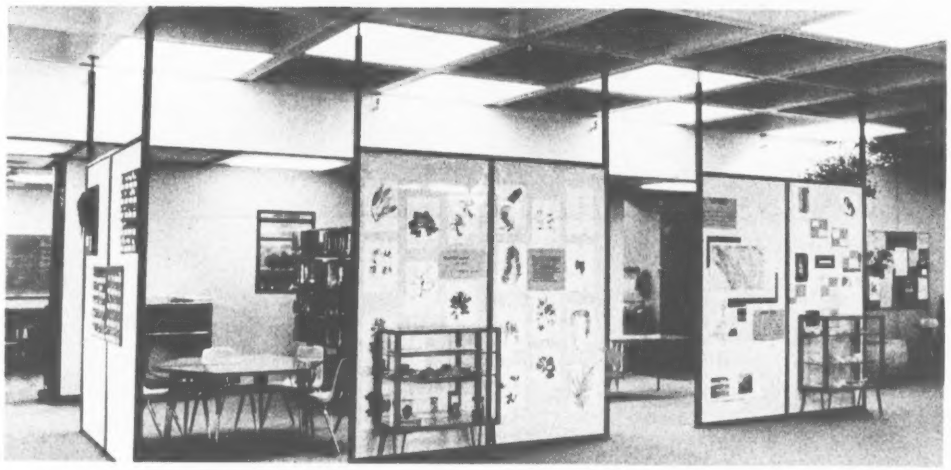
The unaided eye, on the other hand, sweeps up an extraordinary amount of information within a hundred-yard radius and is still quite efficient for human interaction at a mile.

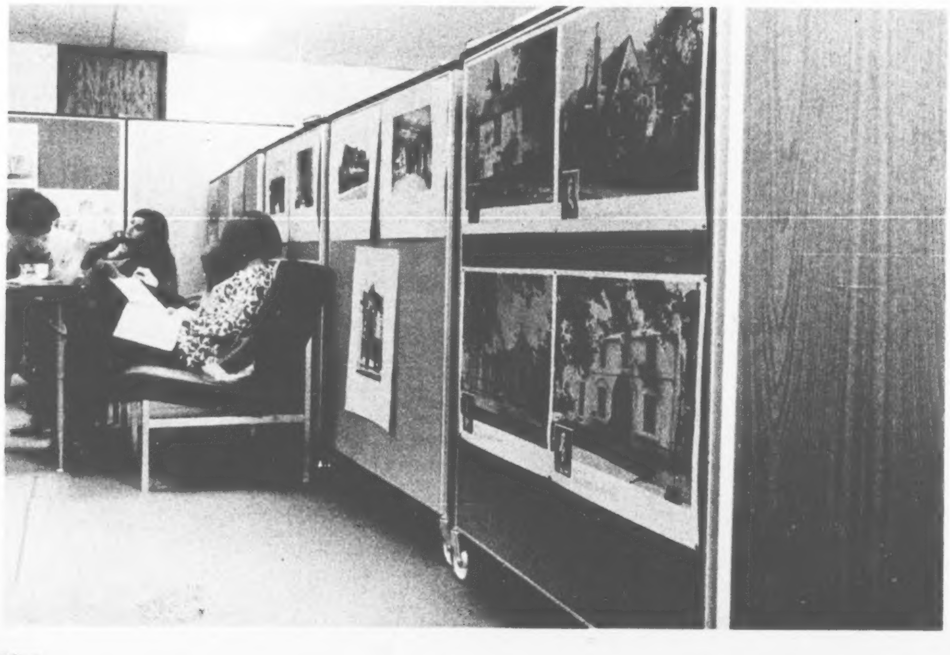
Edward T. Hall,
The Hidden Dimension

No one, to the day of my graduation, had ever taught me to look understandingly at a painting, or a tree, or the facade of a building.

George F. Kennan,
Memoirs

Schools without walls need not be display-poor. Vertical surfaces of freestanding space dividers and movable furniture, treated to receive graphics, serve equally well.





Walls can do more than just stand there. Used for display, they telegraph the work and spirit of a school. Button-like devices on walls, and button-on mounting panels provide a process for easy handling of display items.

6.1 Buttons On Walls

To provide the means for handling display, the solution must deal with both aspects. First, it is necessary to assure that the environment is populated with abundant vertical surfaces frankly ready to receive graphic materials. New buildings, of course, can be designed to accept display as a basic interior esthetic, with the means for hanging and mounting built-in as an intrinsic interior detail. These can be rails, slots, button devices, and the like. Whatever the device, the point is to equip the walls in such manner that visual materials can be buttoned onto them, so to speak, or unbuttoned, for quick and easy changing of exhibit items. The school client would be wise to specify this to the architect as a functional requirement.

In old buildings, many of the existing walls can be fitted with these display-receiving devices. Where there aren't sufficient walls, freestanding, light, portable screens can be introduced—which, in open plan buildings, can also serve as spatial moderators in an admirable collaboration.

Once the walls are readied to receive graphics, there is the second matter of treating the graphic materials themselves so they can be fastened onto the walls. Clearly it is too cumbersome and costly to use traditional picture frames for hanging display items. One approach that is more satisfactory and low in cost, is a concept of "graphic managers"—throwaway panels that can serve as an intermediary between the graphic object and the wall itself. These panels typically could be of treated paperboard or plastic to accept tacking, pasting, printing, painting, washing, and scraping—with a continuous lip around the perimeter for hooking onto the wall-receiving device. When they become unsightly they can be discarded. And they can be taken anywhere for the work of putting on or taking off materials, relocated or rearranged in minutes.

apanese
RINT
Making
atercolor
Painting

(Top) Recessed illuminated display shelves as a built-in architectural detail. (Bottom) For a many-sided view, cabinets of glass or clear plastic.

6.2 Three Dimensional Objects

Artifacts, which are usually entombed in display cases and locked, would be better kept in the open—especially if the display cases used are of the kind that have glass fronts and solid backs. The objects so displayed can only be viewed two-dimensionally. This, in effect, destroys the third dimension essential to sculpture and intrinsic to many other artifacts as well. Less precious art works, machines or pieces of machines, geological samples, craft items, and models can be kept out—touchable, inspectable from many angles, even pickupable. For this function, simple, stable pedestals and shelves are all that is needed.

One engaging kind of beauty a facility can have is the generated and native beauty of activity in process.

...in a recent extension of the stimulus-enrichment approach to the study of "imprinting," experimental chicks were subjected to the following treatment:

> **"The complex environment...consisted of a black-walled enclosure with random stripes and blotches of white paint. Above was a bank of six 200-w light bulbs which flashed on and off at one-second intervals. Two metronomes produced a constant ticking. A radio, tuned to a local AM station, played constantly at high volume. Every 30 minutes, each chick's back was stroked with a foam rubber brush and with a whisk broom for 15 seconds, a bicycle bell rang for 2 minutes, and there was a gentle puff of air from the air compressor."**

This treatment apparently worked wonders on the imprinting response of these chicks, which developed both earlier and more strongly than the chicks who started life amidst more humdrum environmental conditions.

The researchers concluded that, while sometimes suffering from over-stimulation, man normally seeks and thrives on exposure to stimulus objects or situations that are novel, incongruous, surprising, and complex.

Joacham F. Wohlwill,
"Man's Response to
the Physical Environment,"
Journal of Social Issues

A =
L+P

Organized work skills, as basic as the three R's, need to be learned. Clusters of individual mini-offices—personal terrain within institutional setting—provide the place to practice. Using little more space than conventional lockers, each is fitted with storage, display, and work surfaces.

A7 Schools / Homes— The Inseparable Function

The educational process extends into the home. Schools and homes are in a partnership that needs to be integrated and complementary. But this partnership suffers from lack of process or system.

Both students and teachers are workers without many of the services and disciplines normal to other knowledge workers. Only after leaving school and entering occupational activity do we find serious attention to information management, places to generate and maintain work, ways to store and retrieve what we want.

The lack of system in the home is peculiarly destructive for the child. Throughout his school years he brings home (with difficulty transporting them) an array of artifacts from his school work. Most often, all this is thrown away. Most homes are not organized to keep them. Often, they seem of no importance.

This material, on the contrary, is of great importance. The result of everything being thrown away has two serious effects. First, the child is taught to have a low regard for his own accomplishment and his tangible history disappears as fast as he creates it. When he finally goes away to college, the only tangible evidence of 12 years of activity is a transcript. Parents and schools should recognize that a portion of those artifacts are of high personal value to the child and will have a place in his lifetime assessment of who he is. They must have a place to be preserved.

The second effect is that the child, by having no consistent personal system, fails to learn vital skills in information resource building. This demand enters his life as a hard necessity sooner or later.

The lack of information turf is equally serious in both the home and the school. This is a subsystem requirement that needs both recognition and product design.

A8 The Anywhere School

In a highly mobile society with rapidly changing educational needs, facilities are frequently required on short notice. We are finding we cannot wait or afford conventional school-building processes.

Instant schools are being located in surprising places—in office buildings and former mattress factories, in former warehouses, automobile showrooms, and supermarkets.

This experience is demonstrating that schools can be almost anywhere; that schools in real life locations have a vitality and pertinence frequently missing in campus schools remote from community activity; that students are able to go and are interested in going to school where the action is.

Anywhere schools are also blessed with less self-consciousness. No one is guarding the community monument against inventive, opportunistic use. There is less pressure, bell ringing, and inhibiting regulation.

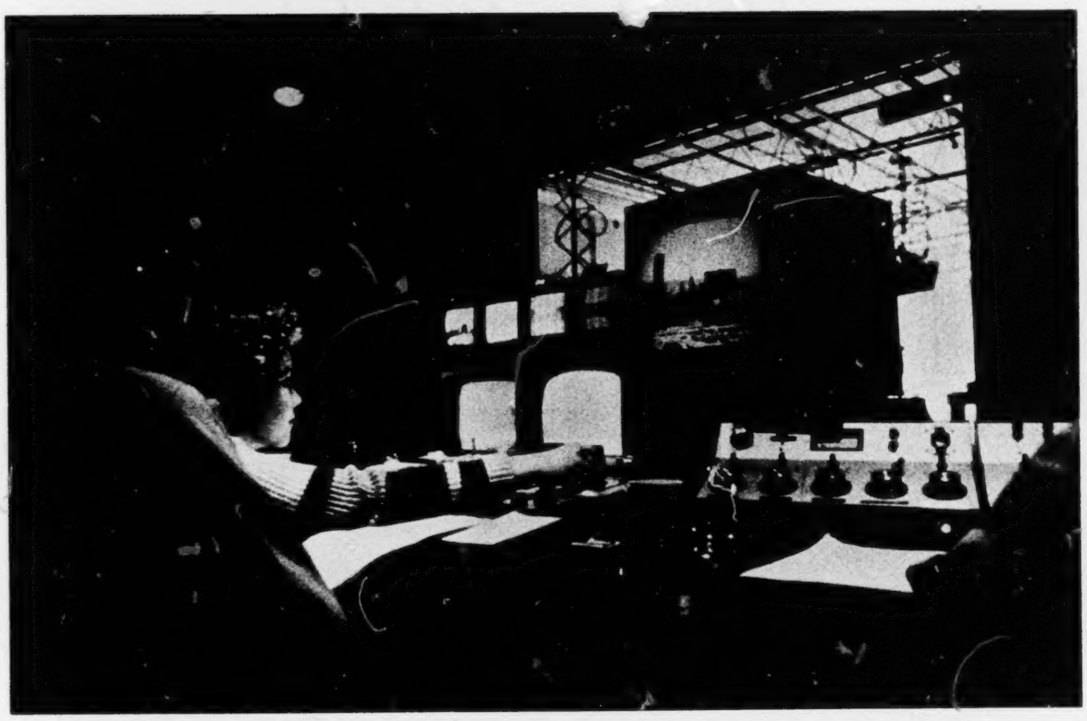
With new portable interior systems, a new wave of facility accomplishment is possible.

Anywhere Schools are emerging as more than just hurry-up, inexpensive facilities. Some are serving as gadflies of the system, nipping at cherished assumptions about how a school should look and work. Some schoolwatchers see in them glimpses of the future—the experimental beginnings of new philosophies and programs that suggest the shape of things to come. Here are a few of the new prototypes.

THE TERMINALS BUILDING
537 DEARBORN STREET
FOR CHOICE OFFICE SPACE

a

c



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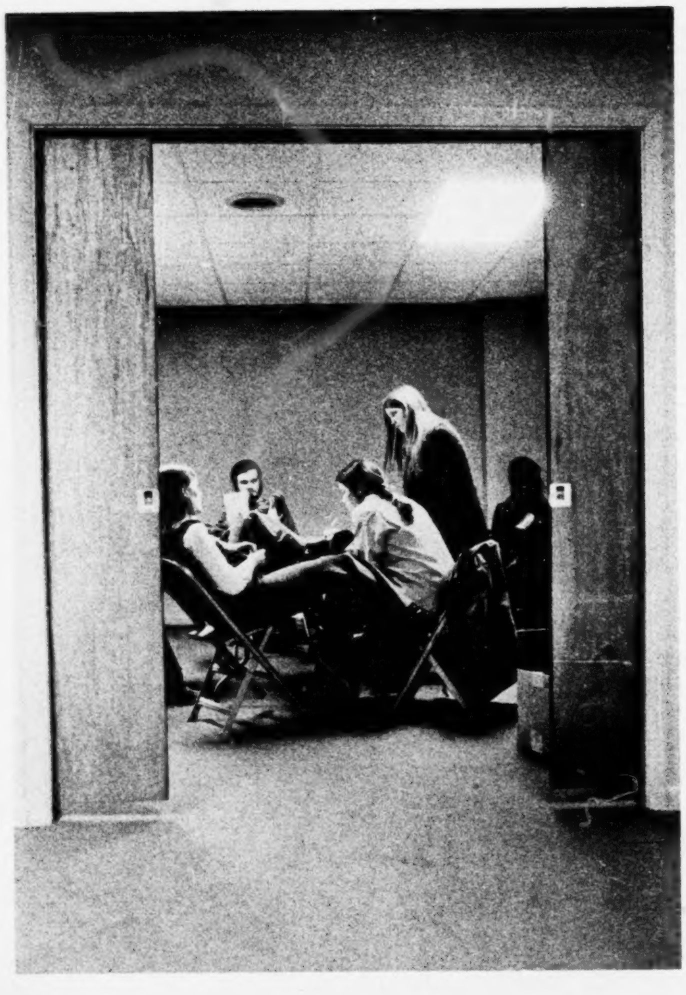


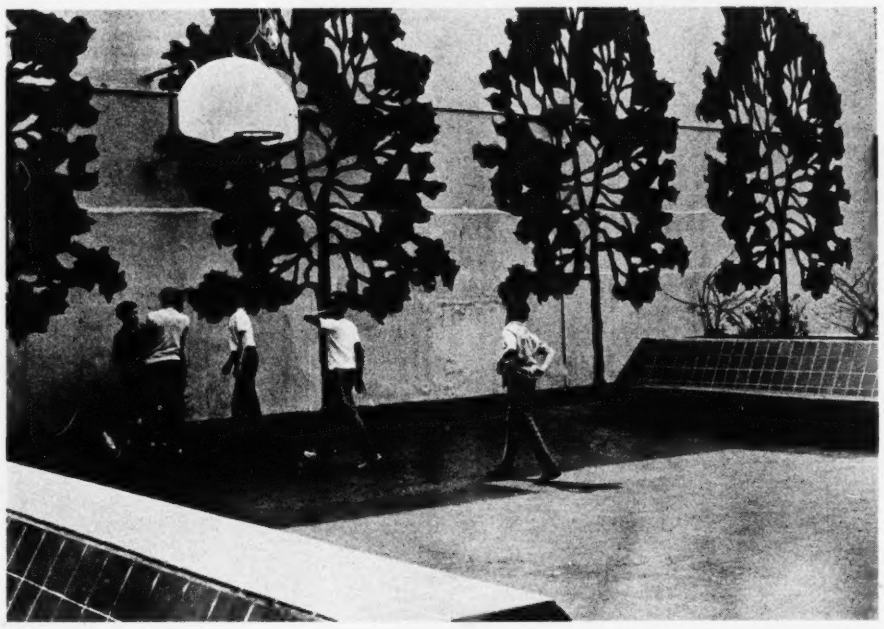
b

(a) Commercial office building in Chicago's downtown Loop is the home of Chicago Metro High School. Three renovated floors provided a quick, economic home base for students who spend half their time in the building. The other half is spent at on-the-spot, real-life classrooms in such places as the Museum of Contemporary Art, Illinois Bell Telephone Company, Montgomery Ward. (b) typical seminar in the remodeled space; (c) students attending a life science class at Primate House of Chicago Zoo; (d) studying communications know-how at local TV station.

314 W. 54 ST.
C.A
W.53

a

b

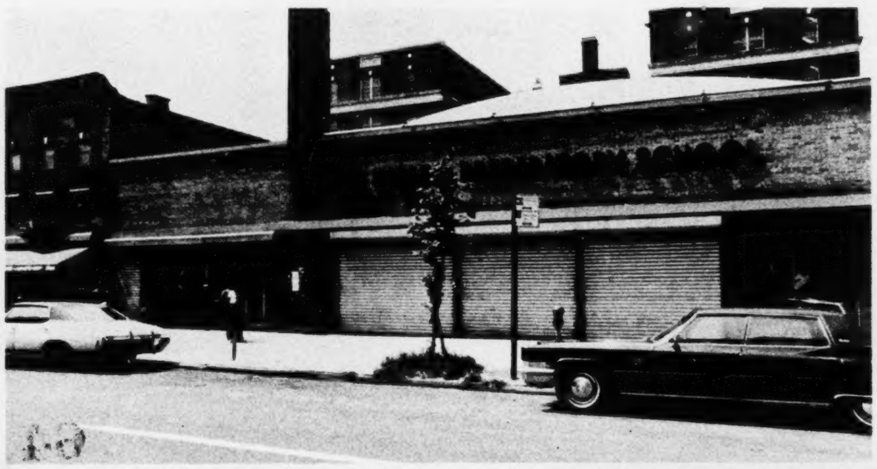


c

Clinton Youth and Family Center—a place for people, not just children; for varied functions, not just schooling; in use all day, not just part of it. Once a police court building, the converted structure now houses a junior high school program, community meeting and club rooms, neighborhood counseling and health services, recreation space. (a) facade; (b) a service office; (c) recreation yard.

(a) Harlem Preparatory School, a street academy for the disadvantaged, where students graduate only when they have been accepted by a college. (b) This ex-supermarket was adapted for school use by a portable interior furnishings system—a kit-of-parts that fit together in a variety of ways.

a



b

Fatigue is not confined to exhaustion of muscles; it is, in fact, more closely related to boredom and nervous tensions.

Clare Turner,
Personal and Community Health

Whatever happened to Pom Pom Pullaway?

Growing up in rural Colorado and going to a small school, I participated for years, as did almost the total population of our grade school, in a game called Pom Pom Pullaway. Looking back, the remarkable thing about this game is that it was organized and run spontaneously by the students (teachers rarely, if ever, were seen on the playground), and it was played passionately by everyone in the school, grades one through eight; boys, girls, the strong, the weak, Japanese, Russian, Swedes, Mexicans, everyone... year after year.

The rules were simple. Two opposite sides of the playground were the bases. The game started with one person designated as "it" between the bases. His job was to catch people and pat them three times on the back as they ran back and forth between the bases. As he caught people, they joined him in catching the others.

As the game proceeded, it obviously became harder to cross from base to base. Eventually forty or fifty children would be trying to catch the final few. Besides being strenuous exercise, Pom Pom was a great teacher and the lessons were many and lasting.

First was its total democracy of participation. Everyone was challenged to win individually by wit, will, or skill, but it also quickly taught the value of cooperative action. Little kids together could catch a big kid. We also learned that girls can be as fast and as strong as boys. All the barriers were down, it was one to one.

Virginia Ransom, housewife
Morenci, Arizona

A9 Health And Vitality

Successful living in schools has to encompass the idea of physical well-being. This is conventionally done through scheduled gym periods where the order of the day is to don a costume and the order is to play. For those familiar with its routines, it is no surprise that "Gym" is frequently one of the least popular and most cut periods in the school schedule.

Opportunities for physical exuberance of the spontaneous unscheduled kind have to be reinvented as part of educational experience.

Horseplay, which is almost always suppressed, is this natural exuberance trying to find an outlet. The universal desire to dance is this impulse trying to find release. When physical activity is repressed in the classroom, it looks for an out in the demilitarized zones of the building—the hallways and cafeteria. As a consequence, behavior in these areas may become so raucous the administrative response is to police them. This treats the symptom not the cause, and the cycle perpetuates itself.

Both the teaching process and the school environment have to incorporate the concept of informal, natural physical movement as a frequent ingredient. What is needed are byways, wide places, free zones, within learning areas. At the absolute minimum, postural release from long periods of sitting is a must.

B For A Live Environment: Management

In public buildings our concern has been with the problems of shelter and control. Only recently have we discovered that public facilities may also need to be responsive and adaptable. This introduces process, and processes require management.

The idea that we manage the environment is hardly new to the homemaker who rearranges the living room or the plant manager who rearranges machines for a new product or more efficiency. But the idea of dynamic management of the school environment is new. We have been trained to accept school interiors as set-piece statements.

A school facility with options and the permission to manipulate is a vehicle in motion. It is taking us somewhere. This is a prospect that both riders and drivers must understand—a new technology that has to do with living.

B1 The Open Facility Concept—Space That Breathes

> **The world's populations are crowding into cities, and builders and speculators are packing people into vertical filing boxes—both offices and dwellings. If, however, one sees man surrounded by a series of invisible bubbles which have measurable dimensions, architecture can be seen in a new light.**
>
> **Edward T. Hall,**
> ***The Hidden Dimension***

The open school interior is one of the happier developments of the sixties. Though less than a decade old, it has been widely adopted and there are hundreds of such facilities in existence. Most of these are elementary schools, which have always been more friendly to innovation than our high schools. But even at the more fixed, more conservative high school level they are now beginning to appear. There is little doubt that with these first incursions, they will proliferate— and for the same reasons they were rapidly accepted at the lower school level: they are the physical response to changing realities in education. And when they are well planned, they offer an environmental tool with surpassing possibilities.

To date, the performance of these open-plan schools has been frankly mixed. Some have been joyously successful, serving as the physical context for schooldays filled with creative teaching and learning, with diversity and pleasure. Others have not been successful at all. Indeed, they have often been a trial to their occupants.

These checkered experiences are evidence of the urgent need for a clear understanding of the open-space concept and the elements essential for its successful application.

1.1 *Perfectly Filled Space*

Because school costs have always been an issue, architects and administrators have always tried to "fill space perfectly"; that is, they define some hypothetically correct number of people who presumably always will be present to fill a particular quantity of square feet. But shifting processes and group sizes that are never predictable or uniform always frustrate this illusory objective—especially when we try to meet it by methodical spatial definitions; i.e., classroom boxes.

Nonetheless, a concept of perfectly filled space does remain important because it deals with a basic human inclination. *People in a space always seek the right fit.* We are all familiar with the tension felt in an overcrowded room or the eeriness of being alone in a gymnasium. Such maladjustments cause persistent discomfort. In turn, this intrudes into the work at hand by draining energy into an unresolvable search for "the right feeling."

Reacting to this, many architects and educators turned to open school interiors. But with the lack of refinement that often accompanies a radical turnaround, many substituted large seas of undefined space for the boxes. In so doing, they exchanged one set of problems for another.

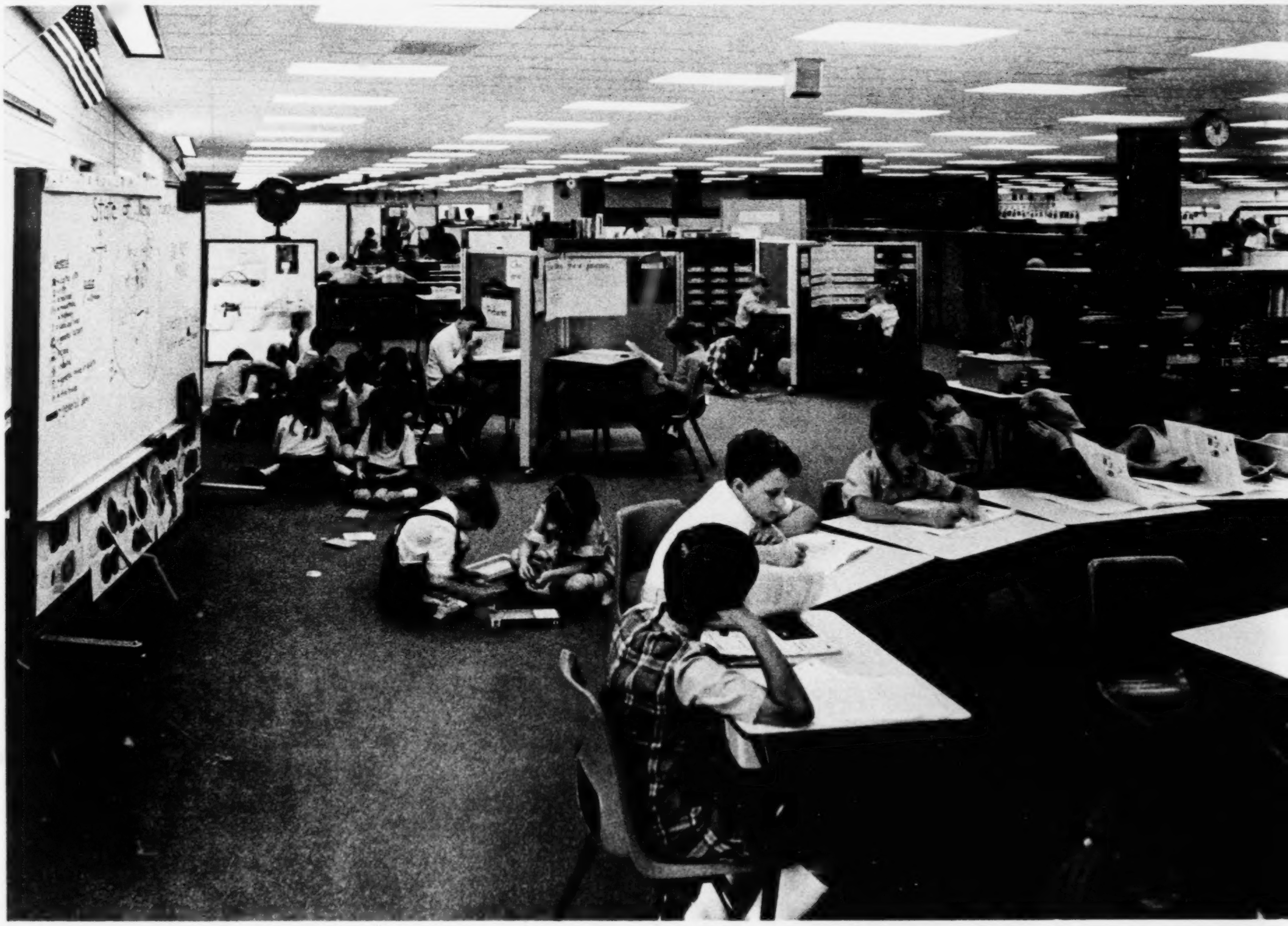
Large expanses without landmarks, human scale reference points, or definitions of territorial edges, are exceedingly difficult to inhabit. Teachers and students in such open interiors find themselves in a perpetual state of territorial tension. Where are we? Where do we camp? Which way do we face? How will we know where to go? Can we find this place tomorrow? Where are the deer trails? Even a playing field must have marks, definitions, and limits.

In open school interiors where the space lacks definition, it is quite natural that groups will tend to cluster near the perimeters and especially in the corners. In this way they establish at least one side of a territorial enclave. (The teachers as the shepherds of their nomadic flocks, unconsciously choose for themselves the most comfortable spot, backs to the walls, and arrange the students with *their* backs vulnerably exposed.)

This psycho-spatial reaction subverts the dynamic interactive potential which is a major virtue of open interiors. And once again we are back to imperfectly filled space with new discomforts—and new inefficiencies as well: inordinate quantities of footage are needed to serve as spatial buffers between groups, and as much as 50 percent of the space may be uninhabitable.

How then, can we reconcile the powerful human desire for a comfortable sense of enclosure with the undeniable advantages of open space? And what is an open school space at its best?

(1.1 Perfectly Filled Space)



Elementary schools, given to less formality than high schools, were forerunners in the development of open plan interiors. Perfectly filled space is shown here in its best sense: enough enclosure, the right distances between groups, options for individuals, and variable activity.

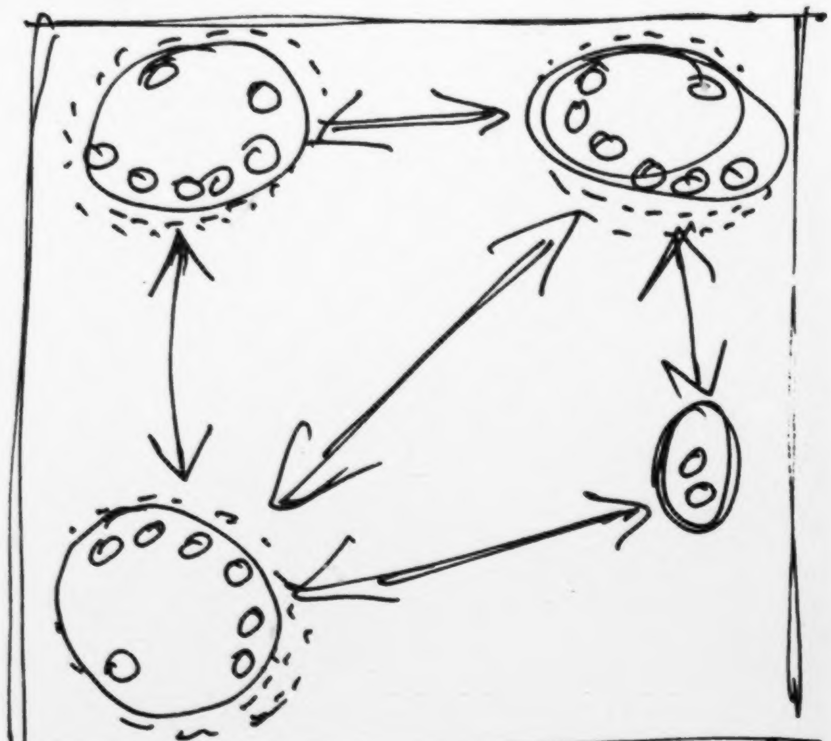
1.2 Space That Is Negotiable

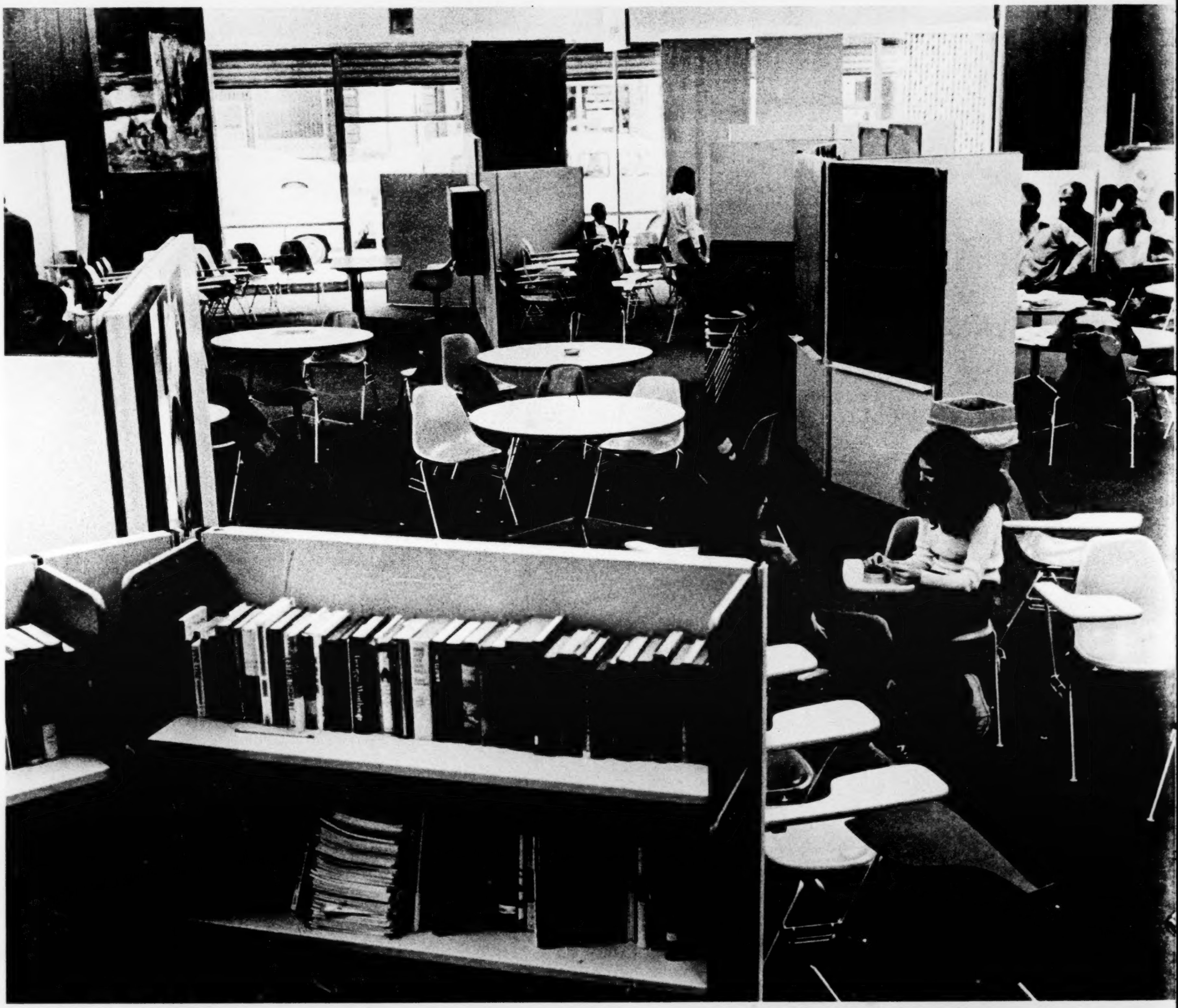
Properly viewed, an open facility is a space that breathes. Its elastic properties allow choice and variety, including *enclosure* to the degree desired. It lends itself to the formation of non-regimented but discrete subspaces of varying size and shape. It allows individuals comfortable personal territory, while it allows any size group to arrange itself in a natural geometry for the task at hand and feel sufficiently surrounded. Its subspaces can maintain a deliberate degree of contact and interaction with the rest of the school. They have intimacy and they have vista. And through the breathing of these discrete, well-marked, partially enclosed subspaces, perfectly filled space can be achieved.

This is openness that is not insistent. It is openness with option. And it is ideal. But can the physical environment incorporate all these possibilities? If so, how?

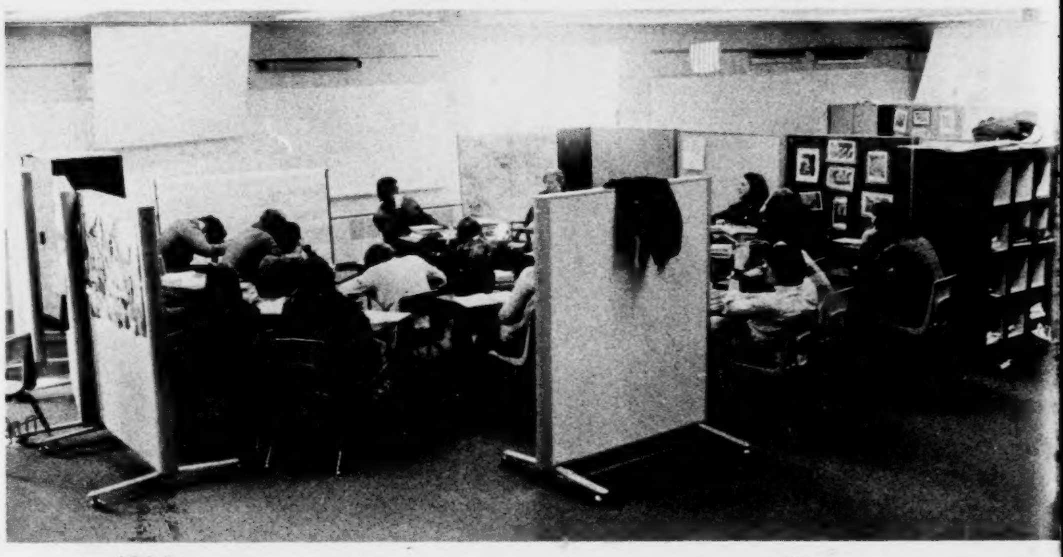
The answer is that it can, given the support of appropriate hardware and services. Part of the problem to date has been the lack of these supportive elements—and concepts of management (more on which, later). Walls, even demountable ones, do not seem very negotiable and, what's more, never seem to know how to stop making rooms or being rectilinear. The more movable units, such as chairs, tables or desks and cabinets, are quite indecisive as territorial devices. They, in fact, have some of the same problems as the humans they serve—where to be. Moreover, the more critical aspects of territoriality have to do with communication privacy, visual and auditory.

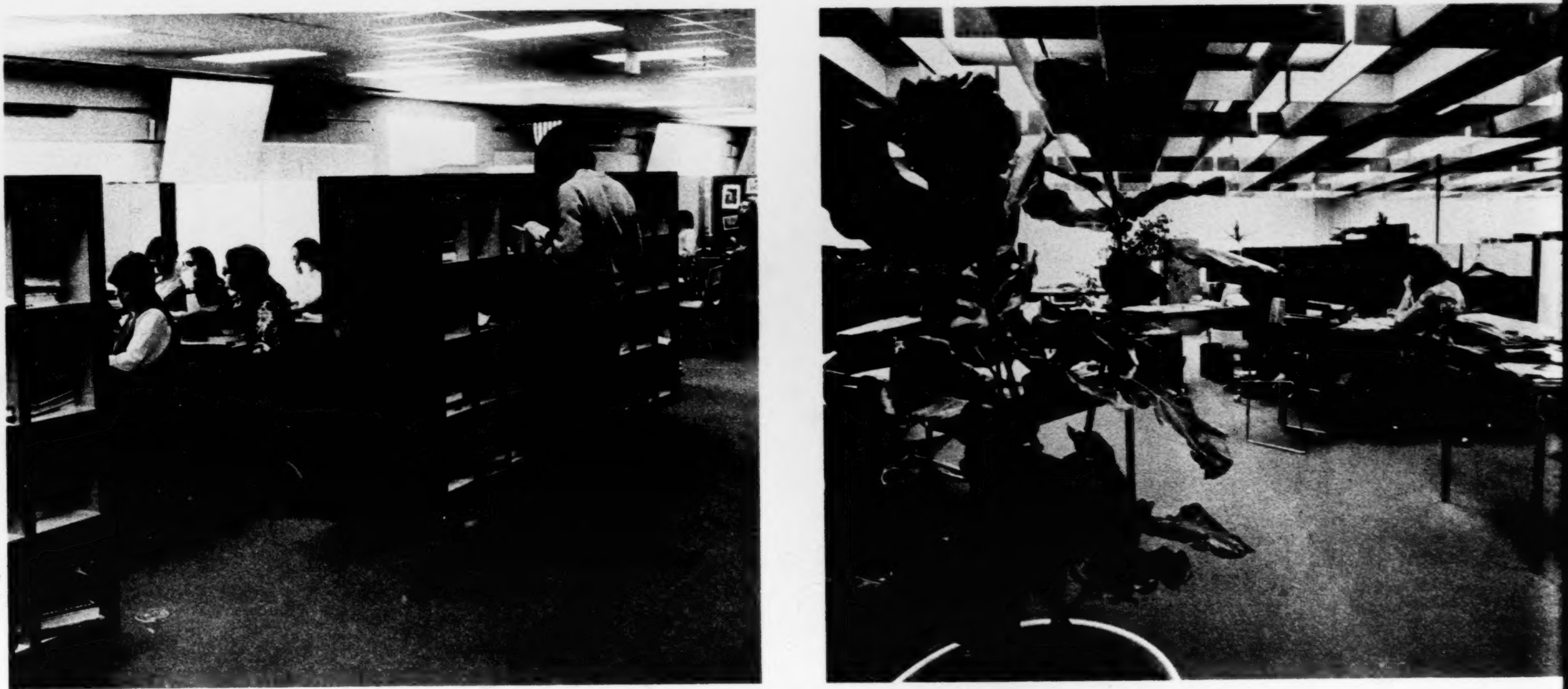
Open classrooms need landmarks. A sea of space without territorial definition forces its occupants to the edges, as shown. Result: less interaction and higher cost as underutilized gross footage becomes the spatial buffer.





Space that breathes allows the negotiation of discrete, partially enclosed sub-spaces.





Tools for spatial definition, for visual privacy. In addition to types of panels shown on preceding page, other devices such as tall rolling cases and plants add to the inventory of tools for creation of territorial sub-spaces.
A good inventory includes dividers of different heights for variable combinations, to screen floor-seated, chair-seated, or standing individuals and groups. (But too tall dividers—over 6½ ft.—should be avoided. They create canyons. More important, they block the vista, thereby erasing the feedback that is one of the richest ingredients in open facilities.)

Units such as chairs, tables, and desks are indecisive as territorial markers.

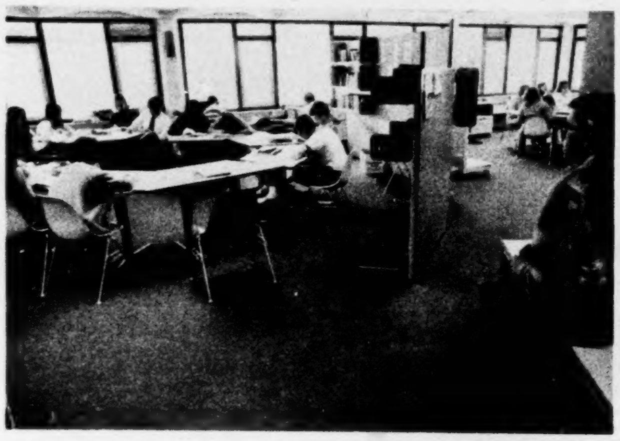
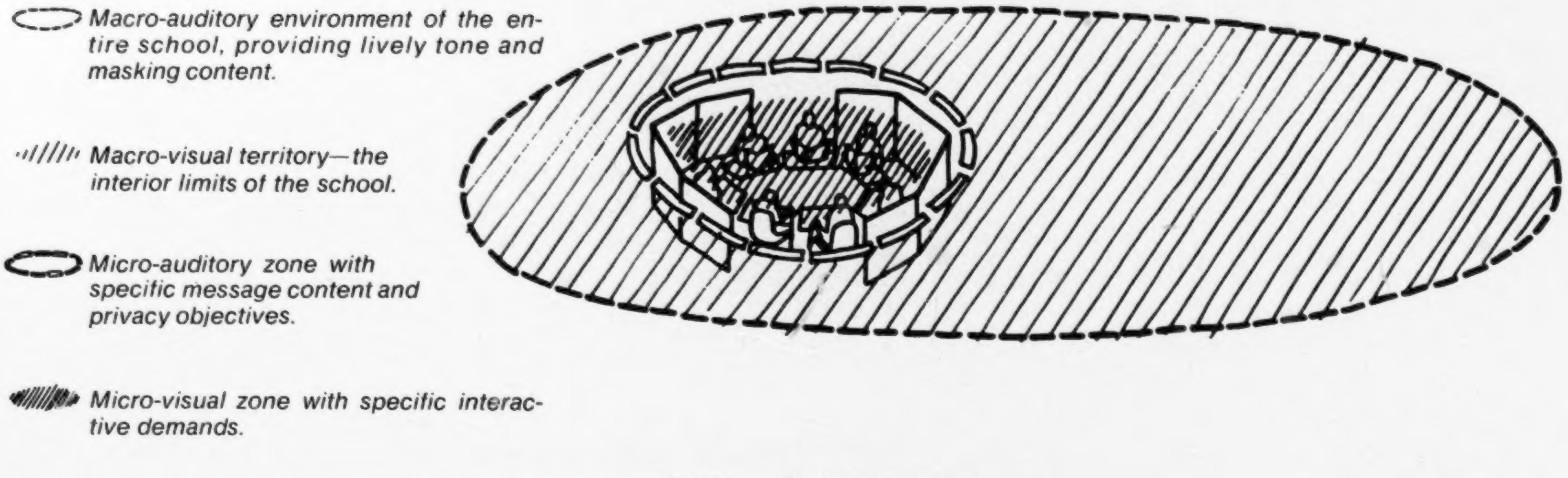


Photo and diagram illustrate visual and auditory objectives within the micro- and macro-spaces. The point: consistency between what can be specifically seen and heard.

1.3 Visual Privacy

The matter of visual privacy can be solved by vertical separation at the level where the communicating elements of the body are located—the eyes, ears, face, hands. Usually, this is in a zone well above the levels of desks, chairs, and most cabinetry. Thus, screening units whose vertical dimensions cover an area the length of an up and down armstretch will provide the dividers that satisfy the visual requirements of privacy (including those of floor-sitters). A good many devices can be used for this purpose: small, rolling or skiddable panel sections, framed fabrics, display boards, tall plants, and vertically oriented storage furniture can all serve well and provide variety in the surroundings to boot.



Macro-auditory environment of the entire school, providing lively tone and masking content.

Macro-visual territory—the interior limits of the school.

Micro-auditory zone with specific message content and privacy objectives.

Micro-visual zone with specific interactive demands.

1.4 Auditory Privacy

This is governed by the same general order and constraints as those of subspaces in relation to the total open space described earlier. It requires its own version of intimacy and vista. Most important, it requires that auditory zones agree functionally with the subspaces. If there is inconsistency between them, the result is unnerving. The effect is like that of being in a closed room where we can still hear the speech of unseen outsiders and know they can clearly hear and understand us. It is a disagreement that is most insidious in that it promises with one hand and takes away with another. (A more detailed discussion of balanced sound conditioning appears on page 91.)

Reserve space is where the "give" is. It provides the free zones and by-ways for independent work, it's for contraction and expansion of territorial units, for traffic, service, and the unpredictable.

1.5 The Reserve Space

Once the micro-environments of individuals and groups are defined, what remains is the space around and outside these enclaves. This is the area for miscellaneous byways, for traffic, service, and for the storage of reserve space. (It might be noted, incidentally, that a "perfectly filled space" is one that has space in reserve. The paradox here is that the negotiability of open interiors resides precisely in the reserve space which is a necessary element for creating comfortable sub-size definitions. It is the elastic used to contract or expand territorial units.)

One of the niceties of open plans is that by using a less formal definition of space, they can freely trade some of the general-use areas with traffic functions. Thus, they salvage for profitable activities the nonprofit footage normally wasted on circulation corridors. In addition to traffic and service functions, the general reserve space is valuable for the byways it provides, for its free zones used for small informal groups, individual work, and miscellaneous activities.

1.6 Spatial Adjustments

Adjustment of territorial units is a game of imperfect numbers. The likelihood that a perfect module jump in size or shape can be matched to a perfect increase or decrease in numbers of people is so improbable it should be abandoned by anyone who wishes to survive as a facilities manager. In real life it is random change in the numbers of people, services, and activities that is the dominating reality. And it is far more common to require adjustments of territory that are matters of inches. (For this reason, incidentally, modular systems designed to make horizontal module jumps of four or five feet are less than successful. They provide too gross an adjustment, particularly if they are confined to rectilinear increments.)

In Sum

To return to a position every planner or administrator recognizes, large numbers of people cannot use an open facility well without a sense of order and method. Such a facility without formal intelligence assumes a shanty-camp quality with teachers and students staking out turf and conducting continual brush wars over where and how much territory is theirs.

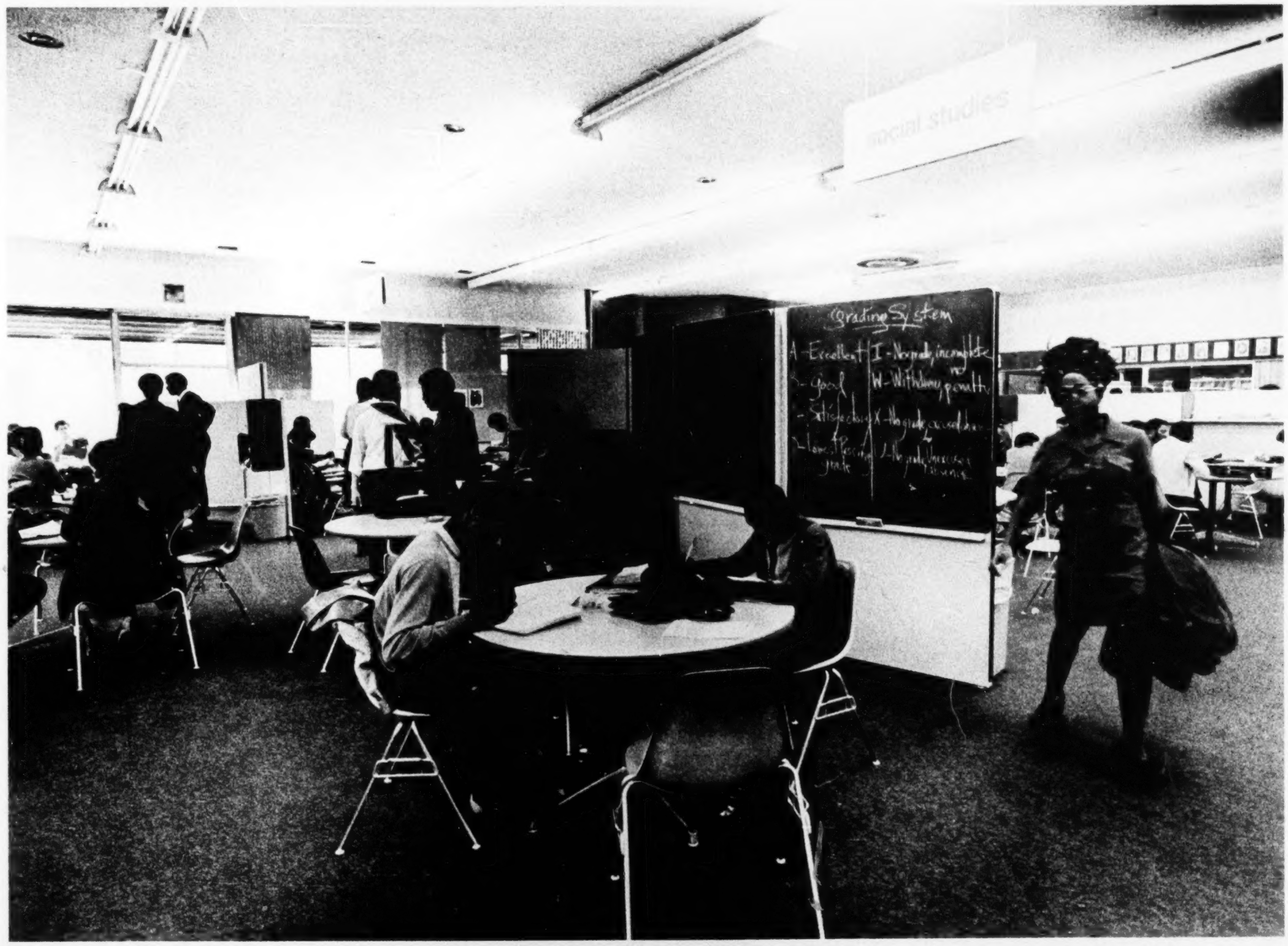
With all its lack of constraint, with all its freedom, an open-plan facility makes possible a remarkably proficient use of space. But freedom throws its own curves. And in the end, as the philosopher Friedrich Engels put it, "Freedom is the recognition of necessity." To exploit all its options and realize its full potential there are, at the least, two distinct necessities that must be recognized in open-space schools.

The first has to do with the preparation of teachers. The difference between teaching in an open school and a traditional one is at least as great as the gap between college training and the realities encountered in the work world. The open setting requires that teachers, both novices and seasoned professionals, be readied for far more interaction with their colleagues, aides, and students than they are likely to have experienced elsewhere; for less "lecturing" and more fostering of self-directed learning, for fluid operational modes, and the like. Without such preparation there is a strong chance they will feel inadequate, resentful, and, in fact, incapable of working effectively.

Education is a fluid process, and like all fluids, tends to take the shape of its container. But if you open up the container with no attention to how it affects the occupants, you're in for trouble. As zones of space replace boxes of space, teachers have more options —they need practice.

Harold B. Gores,
Educational Facilities Laboratories

The second necessity has to do with the environment itself. Flexible design has little to do with flexible use. Teachers and administrators must learn to think like designers. They must approach open space in terms of the manipulation of subspaces. Traffic and communication effect has to be incorporated into their thinking. And since change and motion are central to the open school, all this means quite frankly that management of the environment must become an ongoing process. It must become a familiar tool used with the same kind of purpose and validity as teaching itself. This calls for new roles and responsibilities.


social studies
Grading System
A - Excellent
- Good
- Satisfactory
- Lowest Passing grade
I - No grade, incomplete
W - Withdrawing, no penalty
X - No grade, excused absence
- No grade, Unexcused absence

B2 Traffic And Communication: A Funny Thing Happened On My Way To...

One of the most significant developments in airlines management—use of the computer for an up-to-the-minute record of reservations on flights—was the result of a purely accidental meeting. As reported in the Wall Street Journal...

It all began in 1953 aboard an American Airlines flight from Los Angeles to New York. Sharing a seat on the plane by coincidence were C. R. Smith, the airline's president, and a young IBM salesman named R. Blair Smith, no relation. The younger Mr. Smith, now director of marketing development for IBM's Data Processing division, was on his way east to an IBM school to study the potential of computers, then little more than a gleam in IBM's corporate eye.

During the long flight the Messrs. Smith discussed the complexities of American's reservations system and speculated on the possibilities of computerizing it. After the plane touched down in New York, C. R. Smith gave his traveling companion a mission: "When you get through with that school I want you to review our reservations system."

Blair Smith spent the next three years studying American's problems, and it wasn't until 1956 that IBM decided the project was worth pursuing in earnest. In 1958 IBM committed itself to build the system, and the next year American accepted the proposed SABRE project.

The way we move through space is part of communications experience. Whom we can see and how accessible they are is a variable dependent in large part on the physical arrangements.

Everyone has the feeling that interesting, even wonderful things might happen to him—if fate would somehow provide the circumstances. It is a feeling well-grounded. Many great events, fabulous decisions, turning points in affairs, are the results of fortuitous encounters of people, or people and information.

Therein lies the inherent advantage of being among large numbers of people. It could, in fact, be one of the most important reasons for going to school. But it cannot happen if we are unable to meet and to mix. When everyone is locked into patterns of control and held there for months or years, school experience becomes damagingly narrowed. Sit here, no talking, go straight down hall B to the next class, go home at 3:15, don't look in the wrong stacks. All of this robs us of the rich serendipity school can offer.

Organization managers are learning that all this has to be reversed; that random patterns must be encouraged, the mix of groups changed often, oldsters put with youngsters, the walls moved, the vista changed.

Since movement between areas provides a random but highly interactive circumstance, it should be planned and designed to provide for fortuitous happenings.

The first consideration is to give functionally interactive groups direct access to each other. Teaching functions that work well with each other can share zonal territories with rather light separation, or buffer areas, between them. This allows visual connections plus the potential to move freely back and forth.

(B2 Traffic And Communication: A Funny Thing Happened On My Way To . . .)

Open-plan schools have discovered that visible traffic becomes quite innocuous to learning activities if it is part of the natural life of the school. With the elimination of corridors, traffic motion through much of the school space can be direct, as the crow flies, without creating distraction. In some circumstances where it may be disruptive, visual screens can be used to block it off.

The traffic territories, by providing byways, wide places, and free zones, serve as the presently missing areas where students can work in self-directed or small-group activities. But most important is the yield of these free zones as arenas for informal interchange between students, students and teachers, teachers and their colleagues, and between students and information resources.

B3 Use And Manipulation

The learning process requires the active utilization of the school facility—hands on, not hands off. It is part of the recognition that the education process uses things. If things tend to be stored, out of sight, immovable, untouchable, they are *out of the process*.

Use is closely allied to a process of generation, development, and then the termination of the learning situation. This is a structure we have to get used to. Things are collected, the process is started, it is under way, maintained, finally it is completed, dismantled, and cleared away for the next event.

In my opinion, the compulsively neat person is the victim of an inhuman malady. This has to be here, that has to be there—and before he goes to sleep at night he has to write little memos to himself about how he will organize tomorrow. It is as if he were deathly afraid of life's natural spontaneity.

He lives in a world held together by paper clips. His desk at the office always looks as though it had just been born, his home wears the antiseptic air of a surgeon's arena. He does not inhabit life—he just goes through it.

Hal Boyle,
"Neat Folks (Poor Things) Are Mere Pigeon-Holers,"
Associated Press Newsfeatures

Visible storage keeps things in active use. Out-of-sight may mean out of the process.

3.1 Storage—A Questionable Emphasis

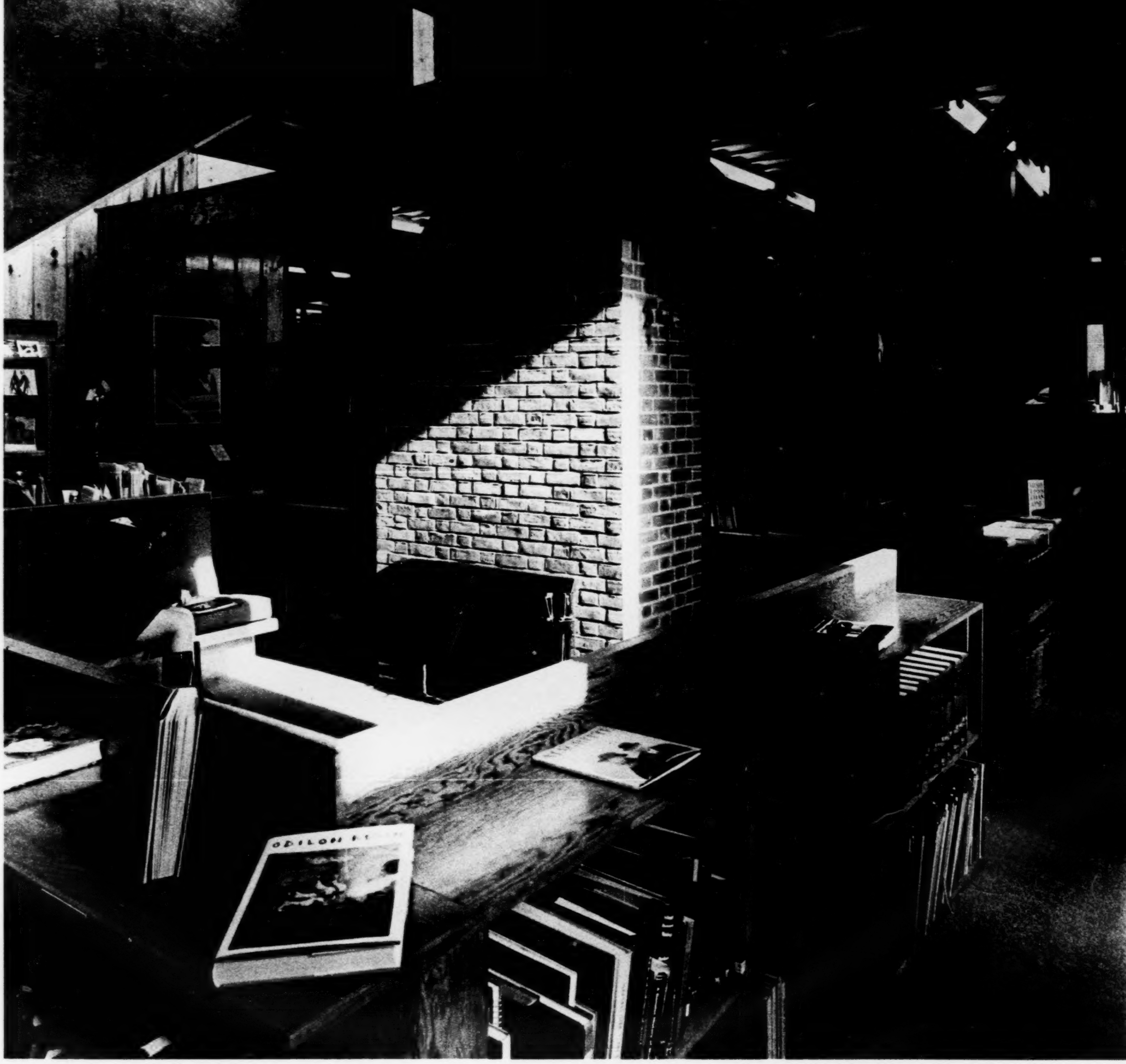
A common complaint in schools is that there isn't enough space to store things, or enough of the right kind of space. And when new schools are planned, ordinarily the designers spend considerable time thinking about storage facilities.

But the emphasis is misplaced. It is use—on line use—not storage that counts. Too much storage of things reflects a dryness of process. When not much is expected to happen, things are put away to wait and wait to be used. Eventually they become abandoned. The drawer in which things get lost behind things, or the low, down-under cabinet that requires acrobatic mastery to get to, is dumb storage. Eventually such *spaces* become abandoned as well as the equipment stored in them. Storage, in fact, turns out to be one of the most static and expensive things we do, given the cost of the raw square footage it consumes, plus case work on top of that, combined with lost or forgotten equipment.

Fortunately, the solution is not complicated. It drives toward tangibility. It keeps things about, advertising their potential by making them visible. (Conversely, the dodo items, if visible, will be removed.) The answer is a light-footed, versatile service system that provides fewer closed cabinets and drawers, and more open shelving—preferably on wheels for easy movement to dispensing points. Where there is concern about the visual clutter of random collections and a wish occasionally to screen them out, the shelving can be equipped with flip-up doors that are decorative or faced to accept graphics.

Pilferage, of course, is always an issue. But it has never been successfully solved by locking things in boxes that are then locked in buildings. More often than not, this "security" attitude promotes a game of stealing from the establishment. A stronger force for security is an open environment under surveillance by everyone precisely because it is open. It self-polices, since inappropriate use, or something unfair to others, is bound to be noted. In the end, the only reasonable way to keep resources easily accessible is in an open self-regulating context addressed to an open self-regulating community of users.

The look of education in action is a busy look, busier than many educators or custodians or parents are used to. But this quality should not be confused with disorder. With all its encouragement of use, a good physical environment also provides the soft pressures that teach limitations and control. Thus, the same equipment that says "use me" also says "there are good ways to do things, and there are things not to do."



Familiar, historic materials have lessons for the new synthetics.

B4 Natural Use—Non-Traumatic Wear

We are so given to thinking in terms of permanence that the notion that school furnishings should allow themselves to be worn and used up is perhaps startling. It is, nonetheless, a position of reality.

The concept of wear needs renewed understanding. With the right kind of materials and design, the wearing process can be comfortable and non-traumatic.

Both these qualities are present in the familiar historic materials: wood, leather, brick, and textiles. They are satisfying to use and remain pleasant in advanced states of wear. Sometimes, in fact, they grow more attractive as they season with time and service.

In contrast, the newer synthetic materials have tended to be indifferent to the subtleties of sensitive wear. Wood by its natural grain has a variation that incorporates marks of wear with equanimity. But synthetic materials must develop their own unique surface properties. Many plastic products are produced in molds with ground surfaces which in turn make for grooved surface profiles. These become dirt catchers but more important, they mar in an unattractive manner. As they lack the wear-accommodating qualities of wood or other natural materials, scratches and nicks which might otherwise blend into the surface or be treated to do so, assume the look of ugly lacerations.

Their failure becomes traumatic. The use of these products becomes increasingly unpleasant as they wear, but since they were selected in the first place for "toughness in use" or "imperviousness to deterioration," decisions to discard them so violate the premise on which they were purchased that they are nearly impossible to make.

Non-traumatic wear is a function of several qualities of design and material:

Surface Aesthetics: A mark of integrity in every material is a surface quality consistent with its performance. The surface must start with a precommitment in profile, lubricity, porosity, and other attributes consistent with the way it will respond to use and be worn away. It is an *in*consistency of aesthetic wear that gives the word synthetic a bad connotation. It is the synthetics that imitate the look of walnut or leather, or have other such pretensions, but deliver a dishonest wear result in terms of what their appearances promise, that produce the gray life problem for the user.

Unselfconsciousness: Low key, simple design absorbs and incorporates wear amiably. It does not quickly look jaded and out of style.

Exceptional event capability: When a 250-pounder crashes against a piece of furniture, it should be able to give; in some cases, pop apart to be snapped together again. Without this capacity it often winds up acting and looking like furniture even an elephant can't crush.

Separability: Parts with different wear rates should be separable by the user for replacement.

Worry-Proof: There is a kind of law of assembled parts that says "anything that can come loose will come loose." Once the user finds an inroad, something loose, something peeling, a tear, he starts a nervous worrying process that results in enlarging the failure to a point of assured destruction. This argues for monolithic construction as free of seams, cracks, bolts, screws, and surface assemblies as possible.

Washability: All parts of institutionally used systems should allow straightforward washing techniques, preferably by machine washers. A periodic removal of grime refreshes and preserves.

Finally, there is the design problem of putting together a total environment which recognizes that wear will happen and allows it to happen pleasantly.

B5 The Human Factors

By being so adaptable, man sometimes gets himself in trouble. He designs and uses things that may, in fact, cause discomfort, fatigue, hazard, and irritation. When their use becomes ingrained, they are accepted as customary. "It was good enough for grandfather, it's good enough for you."

The customary school environment is unusually laden with such anti-people items. The users, teachers and children, have no voice in their choice. Would they have selected them for themselves? Would *anybody* select them if they were going to use them themselves?

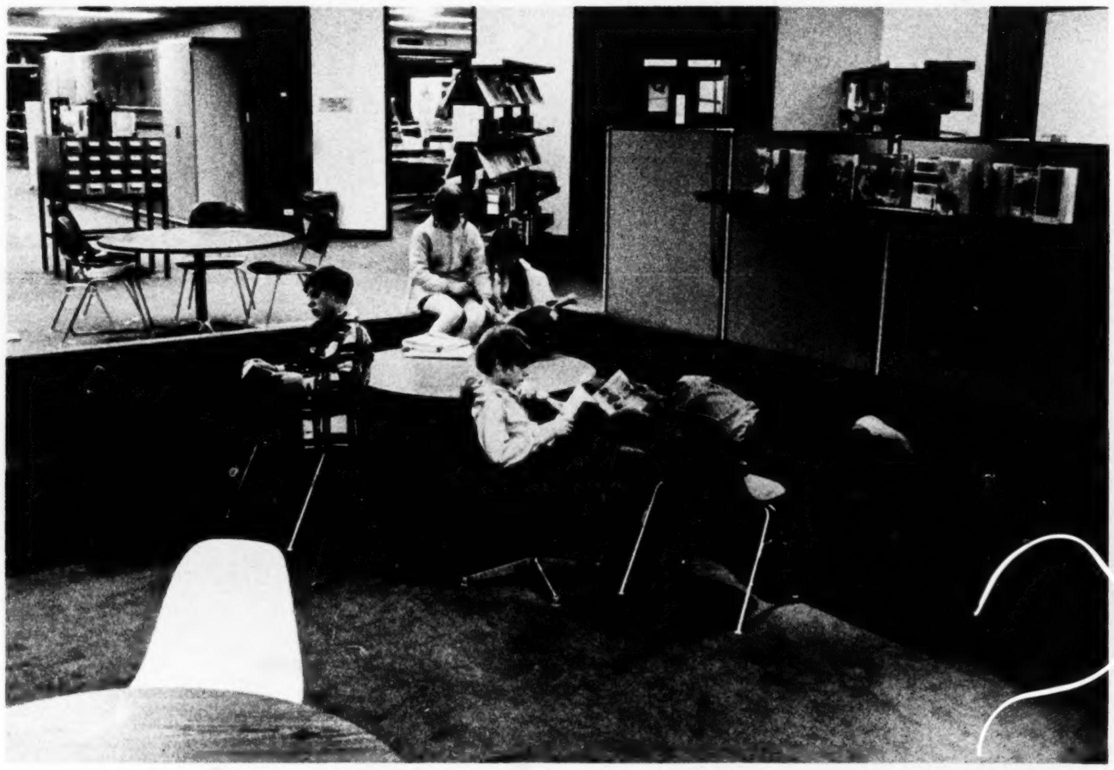
There are some key human attributes and limitations we need to remember in devising school arrangements. *The human body has evolved as a machine able to do a remarkable variety of things but no one thing for any long period of time.* For example, pressing your finger against a surface is no problem at all for a few minutes but if you had to do it for an hour, it would be agony. A good many problems in schools arise from positional or activity freezes.

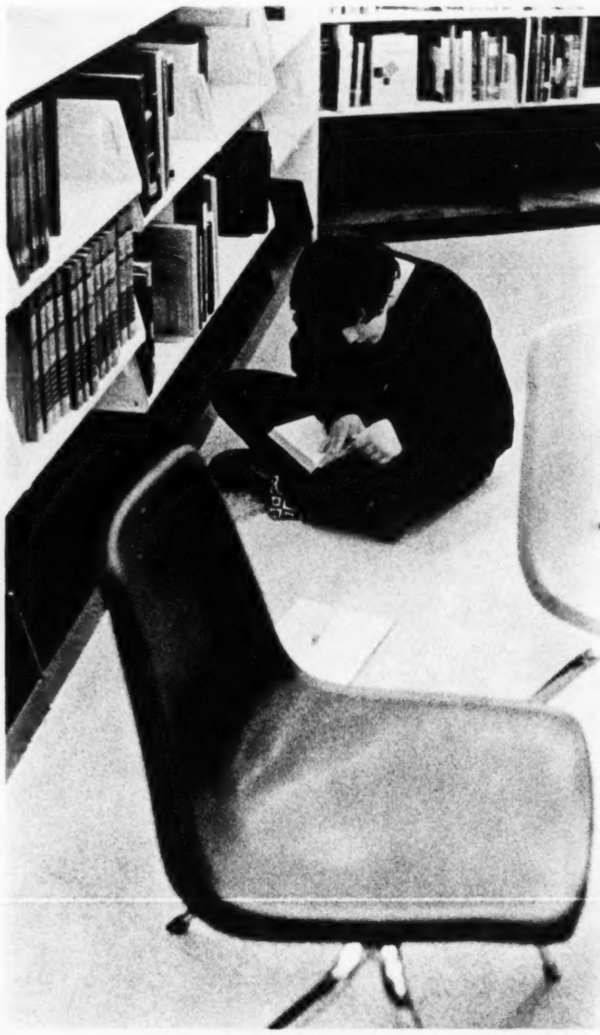
5.1 The Sitting Business

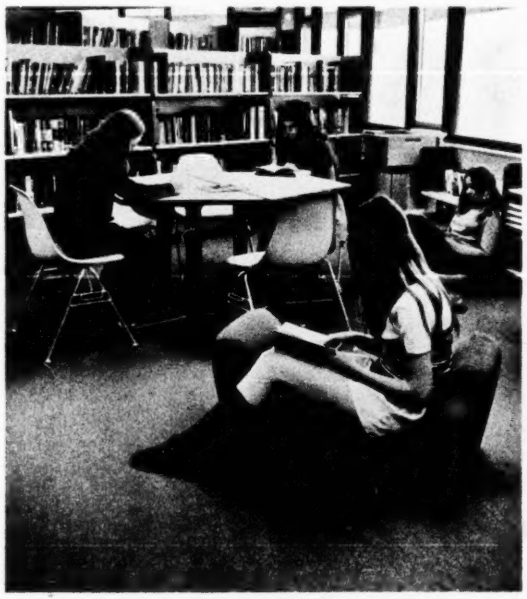
> **When government clerks, executive officers and post-office telephonists (males) were all found to have the same kind of excess incidence of coronary heart disease, age for age, in comparison with postmen, we plumped for the possibility that differences in the habitual physical activity involved in these jobs might be responsible for the differences in ischaemic heart disease.**
>
> **Bus drivers had the same excess incidence over conductors. The conductors walk along the decks and climb and descend the stairs of these double-decker buses; postmen walk or cycle, carrying and delivering the mail, for about 70 percent of their working day. This seemed a more sensible proposition than one relating to "stress" arising from the emotional and social demands of the jobs, which was a likely enough cause in bus driving or operating a switchboard (at night often), but did not impress us about clerical work in the bureaucracy.**
>
> **A hypothesis was therefore formulated to guide further investigation that physical activity of work is a protection against coronary (ischaemic) heart disease. Men in physically active jobs have less ischaemic heart disease during middle age, what disease they have is less severe, and they develop it later than men in physically inactive jobs.**
>
> **The hypothesis has been confirmed and still stands.**
>
> **Dr. Jeremy Morris,**
> ***Uses of Epidemiology***

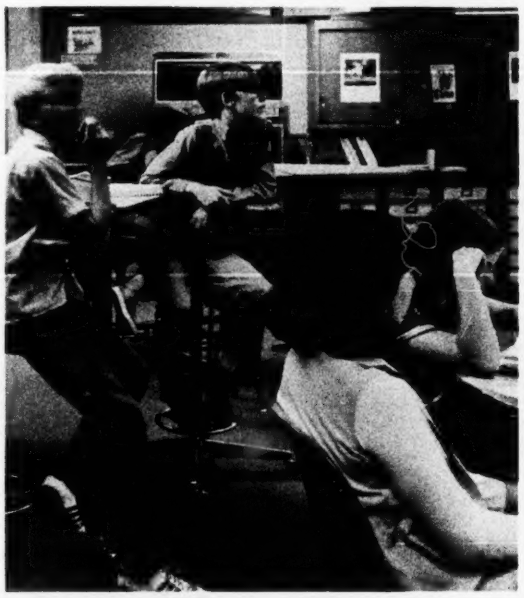
During World War II, when combat pilots began to fly long missions, they found it was excruciatingly uncomfortable to sit for all those hours and be alert and effective at the same time. Human factors researchers began to look into the phsyiological effects of sitting. As their investigation expanded in scope, they found that as a nation of sitters, we not only suffer short-term losses in vitality and alertness, we are subject to a related long-term decline in health. Medical research tells us that sitters tend not to live as long as those who live and work with more postural variation. It is ironic that the first thing we teach a child is to sit quietly for long periods on a hard seat. The question is, what are the postural patterns that are compatible with teaching and learning activities?

The sensible objective is to allow wide postural variation. However, the classical classroom, saturated with seats and desks, doesn't permit this. There is no place or means of variation. Open-plan schools, with their ability to manipulate space and seating, and with carpeted floors, have the option for more variety. It is entirely plausible to conduct discussions with students in standing, leaning, or perching postures as well as sitting. Reading is more naturally accommodated in lounging or even floor postures.

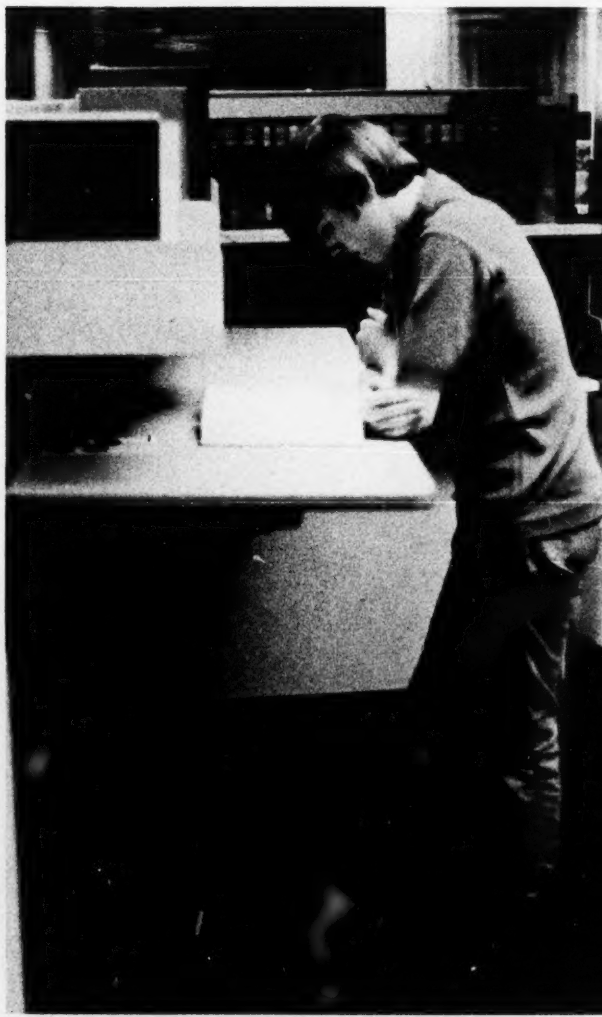








Needed: A variety of seats and non-seats for changes in posture that occur naturally in course of day.



5.2 Paying Attention

Dr. Robert Haakenson, Manager, Smith Kline & French Laboratories, told an audience at AMA's Management Course that the average person is engaged in some form of verbal communication during 70 percent (11 hours and 20 minutes) of his waking day (about 16 hours). Forty-five percent of that time is spent listening. But we forget 50 percent of what we hear within 24 hours, and another 25 percent in the next two weeks. Result: the loss of 75 percent of all we hear. This forgetfullness rate applies not only to casual chitchat, but also to serious business and educational conversations, interviews, conferences, speeches, and the like.

Harwood F. Merrill,
"How to be a Better Listener,"
The Listening Post

Teachers frequently note the problems of keeping students attentive. The capability of the teacher and the quality and pertinence of the material are certainly prime factors. But there are other contributing factors. What are realistic interest-span lengths?

In general, after 20 minutes of a lecture, listeners begin to suffer a heavy attrition in attention. For discussions or participatory activity, about 40 minutes exhausts the attentive capacity of most individuals.

We are victims of the clock. We have hours, so we use hours as a teaching module. It is more appropriate to think in terms of shorter time units. For lecture-oriented teaching, there is another hazard.

The human performer ordinarily speaks at about 125 words per minute. Our listening rate potential, however, is much higher. We could, if words were delivered fast enough, easily digest speech at 400 words or more per minute. The consequence is a rather high mental woolgathering while the mind waits for sentences to go together.

But paying attention is also a relative matter. Every student has experienced television and movies which expend millions to gain and hold attention using lavish audiovisual tools. Gaining and holding the student's interest will not be easy now that they have had those other experiences.

Even very capable teaching will need more change and variety in programs, and more mobility of students within and outside the schoolhouse as they utilize more complex time modules.

5.3 *Facts In Long Rows*

About 300 years ago thinkers began to notice a peculiar limitation of the human mind. If we are confronted with too many units of information at one time, we have a mental boggle. If, on the other hand, information is delivered in small packages, no more than seven units at a time, and if they are marked, symbolized, and unified, then the mind can handle unlimited complexity. (This phenomenon is sometimes described as the Magic Seven, Plus or Minus Two. This means that some individuals can handle up to nine units at a time, some as low as five.) The instructional process can easily boggle the student with a long procession of facts and information. It is important to spend more time organizing information into the small, building-block packages the mind can handle.

5.4 *Anti-Man Forms*

Everyday living seems relatively safe to us, but this is only because we are careful, constant, subliminal testers of the safeness of our surroundings. The human animal is relatively fragile—not so tough as an alligator nor so resilient as a cat. We puncture easily, get bruised by bumping into hard things, scratched by rough things, burned by sun-heated metal; we feel chilly in drafts and headachy in glares. Comfort is the absence of hazards. The school environment tends to be a rather poor microenvironment. Sharp-edged tables are a constant discomfort to arms. Table legs interfere with normal leg motions. Knees and ankles are especially sensitive and vulnerable to corners and edges. By and large, the things we touch and feel are far too hard, edgy, cold, and unrelenting. We like things roundish. cushiony, warm to the touch.

B6 Sound Conditioning

Most of the time we are quite unaware of the acoustic environment. It is simply there, like a moderate temperature or reasonable light. When we become consciously aware of sound, it is because we are picking up an obtrusive effect. But an environment without sound is also obtrusive—and, in fact acutely uncomfortable.

A comfortable sound condition has two qualities: appropriate content and level. The level may be surprisingly high and still be unnoticeable *if the content is in context.* For example, a tray of dishes clattering to the floor in a restaurant may have the same decibel level as the sound of the ambient movement and conversation, but it will immediately rivet everyone's attention because it is inconsistent with the normal sound content.

A good sound environment in a school has the same quality as a good cake. It uses a wide variety of ingredients to make it interesting. It balances them so that no one ingredient becomes exceptional, while it avoids blandness. And it is compatible with the other foods—the other events.

It is people and activity that provide these ingredients. The sound naturally generated by them should not be suppressed. It should be used for cushioning. Places where natural sound levels have been heavily dampened turn out to be uncomfortable because they produce a problem in contrast, as well as content. Any sound—a chair scraping, pages turning, a cough, someone talking, becomes magnified. And, in between these obtrusive sounds, the silence is flat if not eerie.

There are situations, however, where some kinds of sound suppression are useful. When an environment is full of hard surfaces, as in the case of most schools, it is prone to be clangorous and reverberent. This can distort the sound of normal activity like walking or closing a door, to a point where it interferes with oral communication and becomes an irritating intrusion into our conscious awareness. Carpeting, of course, has become the major tool for solving this problem.

Sound conditioning is now a usable technology and the school client, especially in open-plan buildings, can benefit from its services. But even then, the user himself must be aware of his own role in contributing to a successful acoustic affect. He has to provide zonal management by situating near each other only those activities whose sound content and sound levels are naturally compatible. The sounds of a music or shop area, for example, are not likely to be compatible with a foreign language teaching area. Planning and scheduling of appropriate adjacencies are necessary.

Those of us who grew up in traditional eggcrate classroom buildings and are unaccustomed to the uniformly higher sound levels of open-plan schools have to recognize familiarity as a factor in judging sound comfort. Even a significantly better condition may seem foreign at first to those who have become inured to a poor environment.

Finally, there is the matter of taste. The librarian and the basketball coach would not be likely to agree on the qualities of good sound. What's more, there is a good deal of evidence that Americans are seeking significantly more kinetic, energetic surroundings—witness the earsplitting musical styles, the revved-up motor sounds, and so forth, popular among the young. We should expect that this new acoustic appetite will want to be expressed to some degree in the life-style of schools. Our orientation has been so directed toward removing sound and hushing things, we fail to realize that in so doing we very often remove the desirable, content-laden sounds that express the unique culture of a place. We need to learn that sound *expression* merits the same attention we give to sound suppression. In the same way that we specify other facility requirements, we should be prepared to specify the character of sound we want—especially as the technology is available to deliver it. It may be we will find that the acoustic flavor we want in our schools is far more animated and vigorous than the "quiet" of the past.

B7 Sight Conditioning

A good visual environment is a collaboration between the properties of the objects we look at and the way they are illuminated. Objects have variation in shape, texture, color, lightness, darkness, intensity, and pattern. The light projected on what we see has its own variations in intensity, color spectrum, and direction or zonality. Unless the two are equally considered in planning, unpleasant or unsuccessful visual accidents are liable to result.

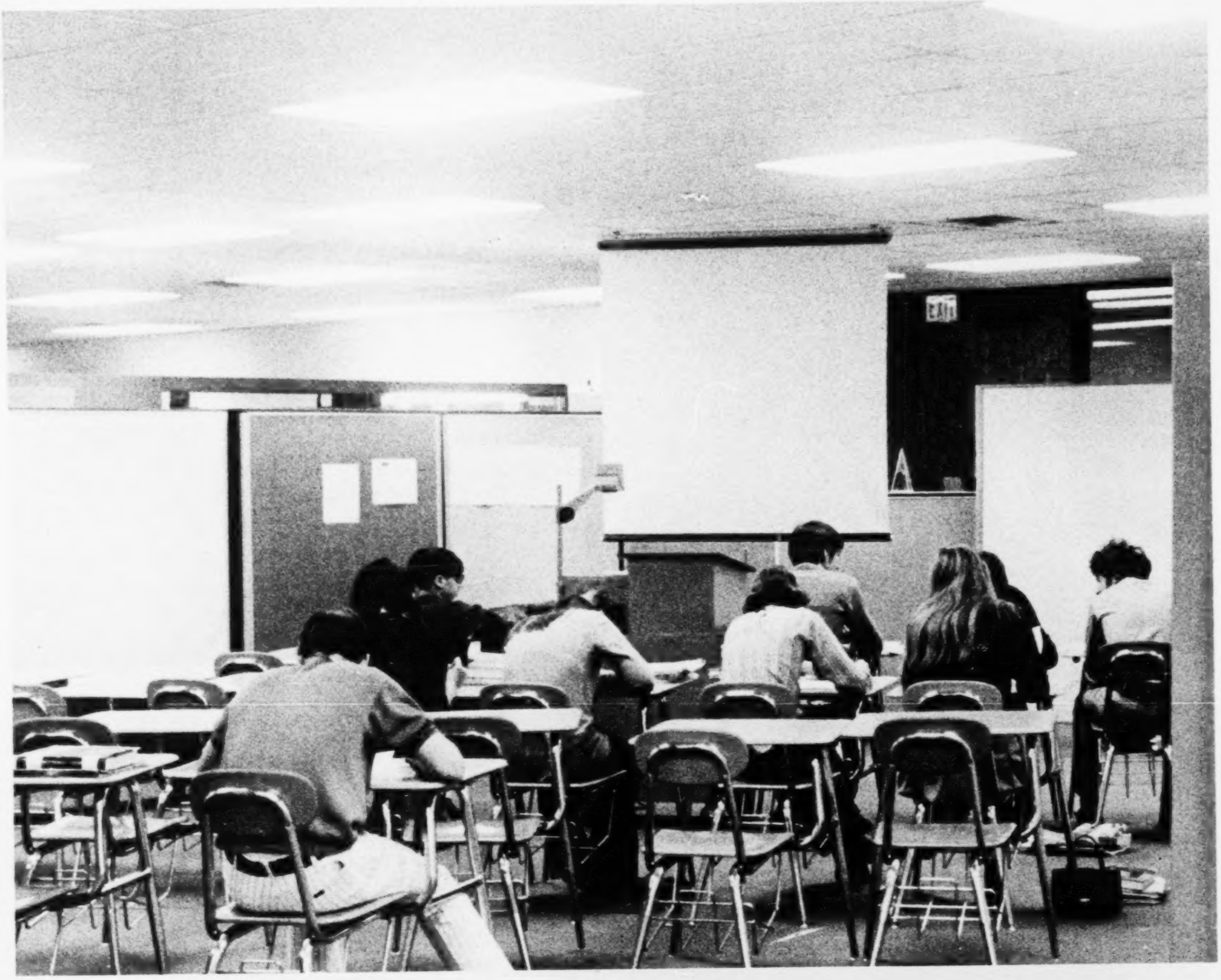
What visual quality do we seek in our surroundings?

First, we should recognize that both the communication and quality in seeing depends on contrast. There has to be variation and definition. If an environment proposes to be visually rich, it has to have contrast but it also has to have it orchestrated.

There has been a tendency to blast school interiors with light far beyond the necessary levels of illumination for reading and writing activity. The net effect of such saturation is to rob the environment of communication detail. Forms become flat, harsh, and sterile. This is particularly significant in its effect on how people look to each other; subtlety and dimension are washed away. It also robs space of tonal interest and variation.

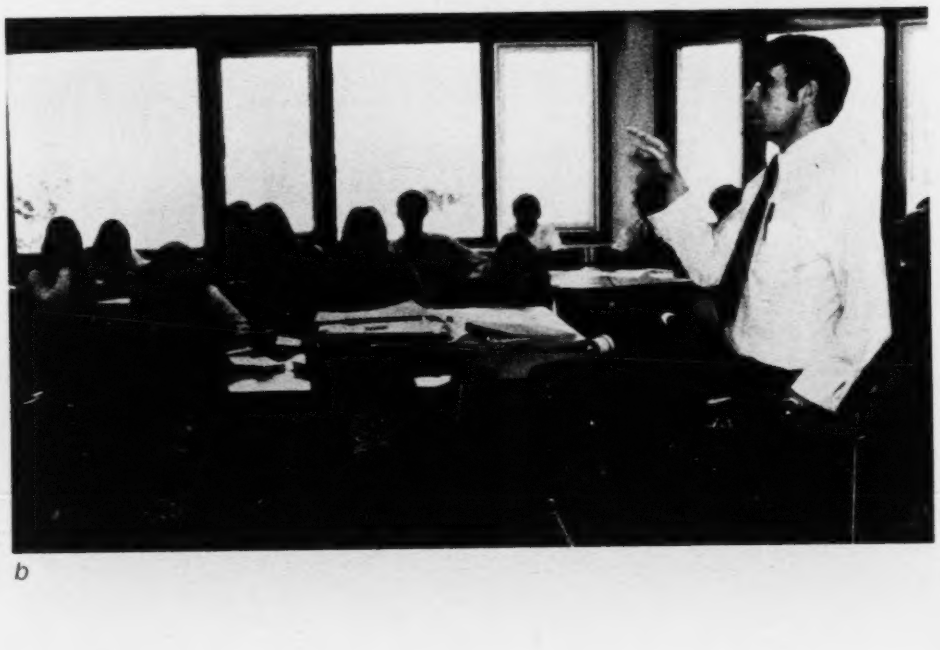
Rewarding experience in what we see depends on this perceivable variation and detail. On the other hand, however, schools have also suffered from too much contrast. This has been caused primarily by the excessive use of window walls. Large glass areas would pose no particular problem if the outdoors were perpetually overcast. But a bright day produces an exterior light level no interior can match. In this situation, large glass areas provide a super-contrast light backdrop against which all forms tend to be visible only as silhouettes. In many typical classrooms, the teacher is positioned against an interior wall looking at students arrayed against a large window area. On bright days, the students, particularly those near the window area, may

B For A Live Environment: Management



a

(a) Too much of a good thing: excess illumination. Light-blasted interior makes forms flat, robs environment of tonal variation. (b) Another common problem: glare caused by high contrast. Result, loss of visual detail and facial communication.



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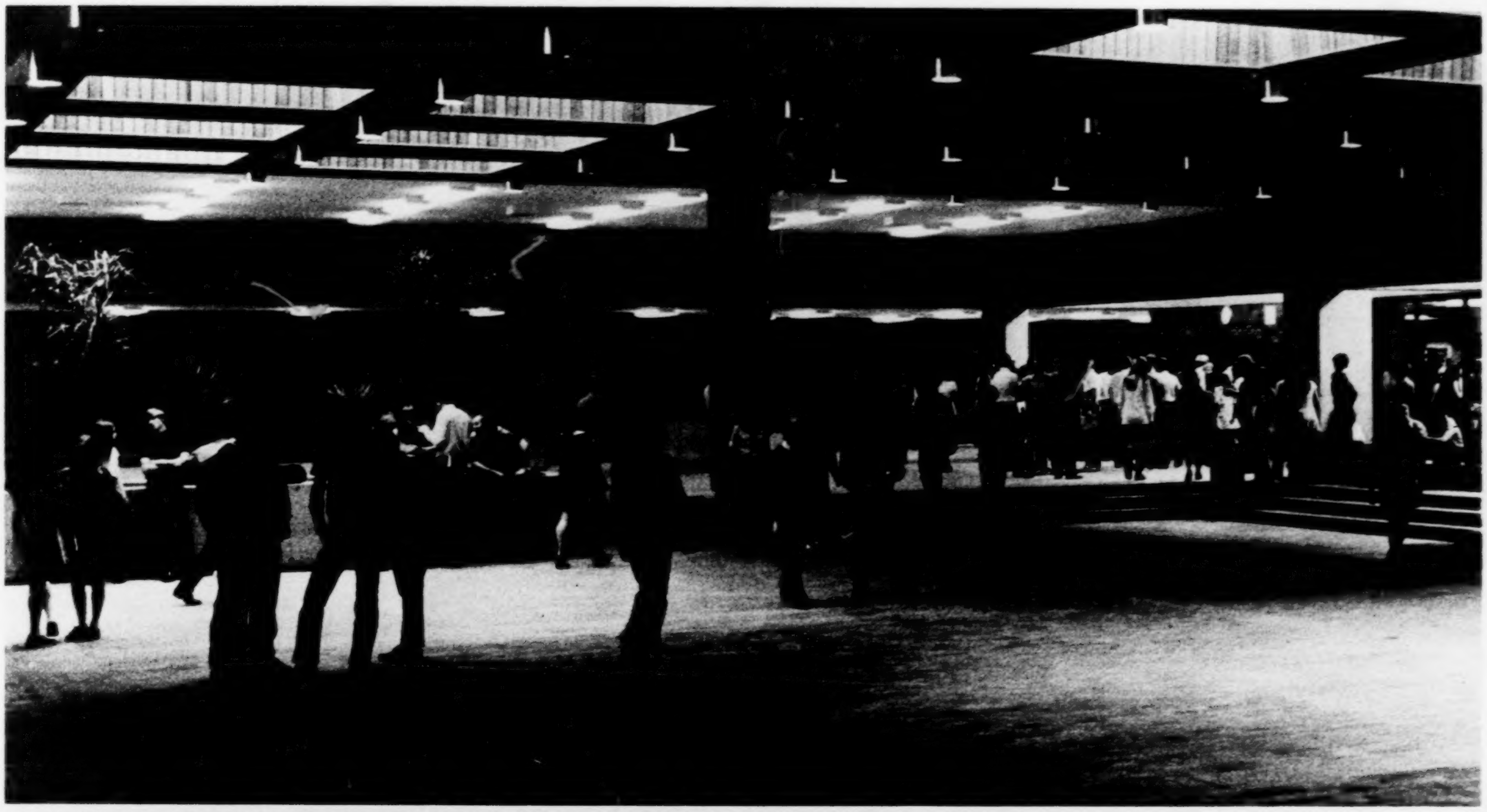
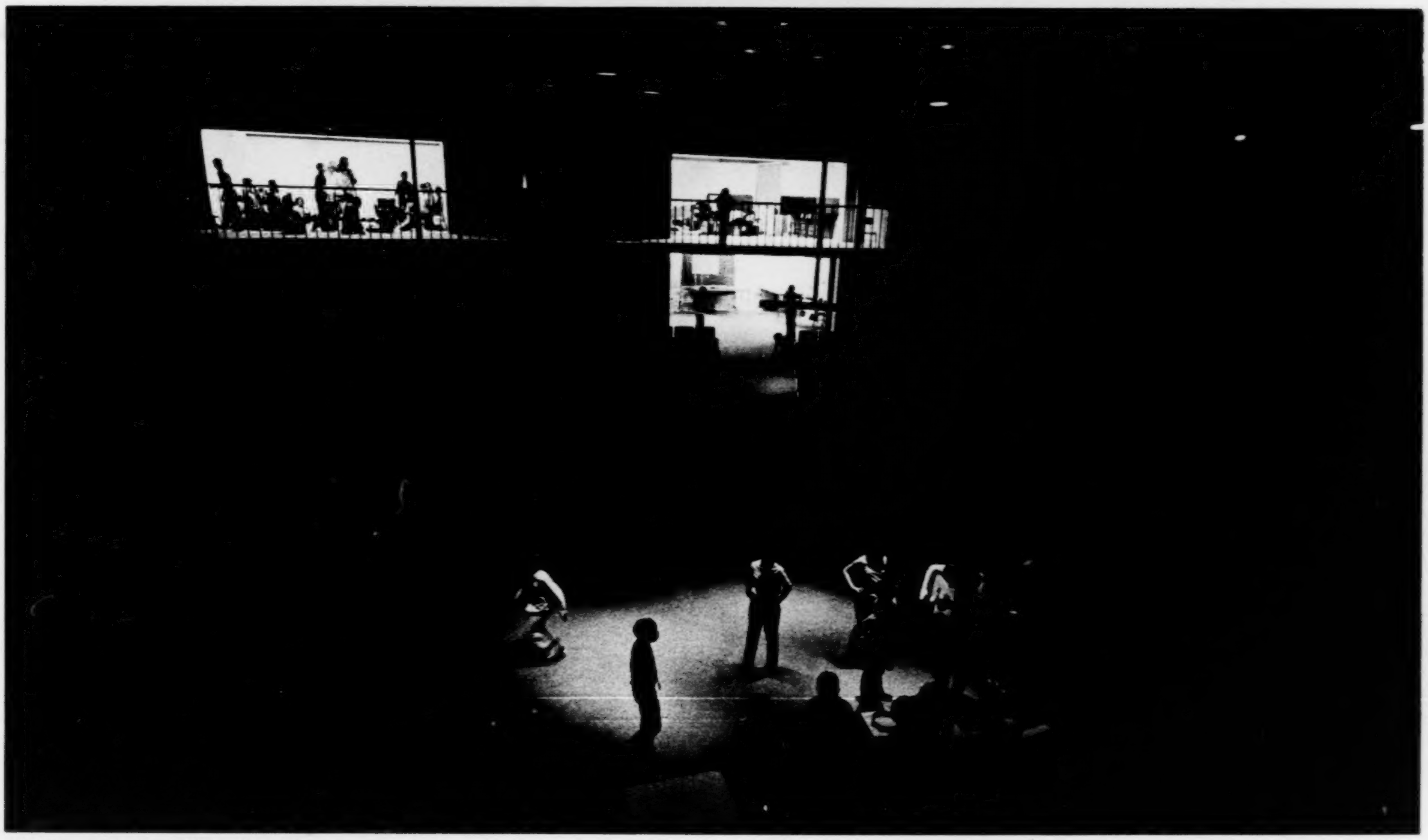


A mix of fluorescents and incandescents makes for pleasant tone.



Lighting as a dramatic tool to define zones of space.

well become facial blanks to the teacher. A very important communications link is weakened or lost. How does the student feel? How is he reacting? Is he puzzled? Does he understand? These are all nonverbal messages easily perceived in a face we can fully see.

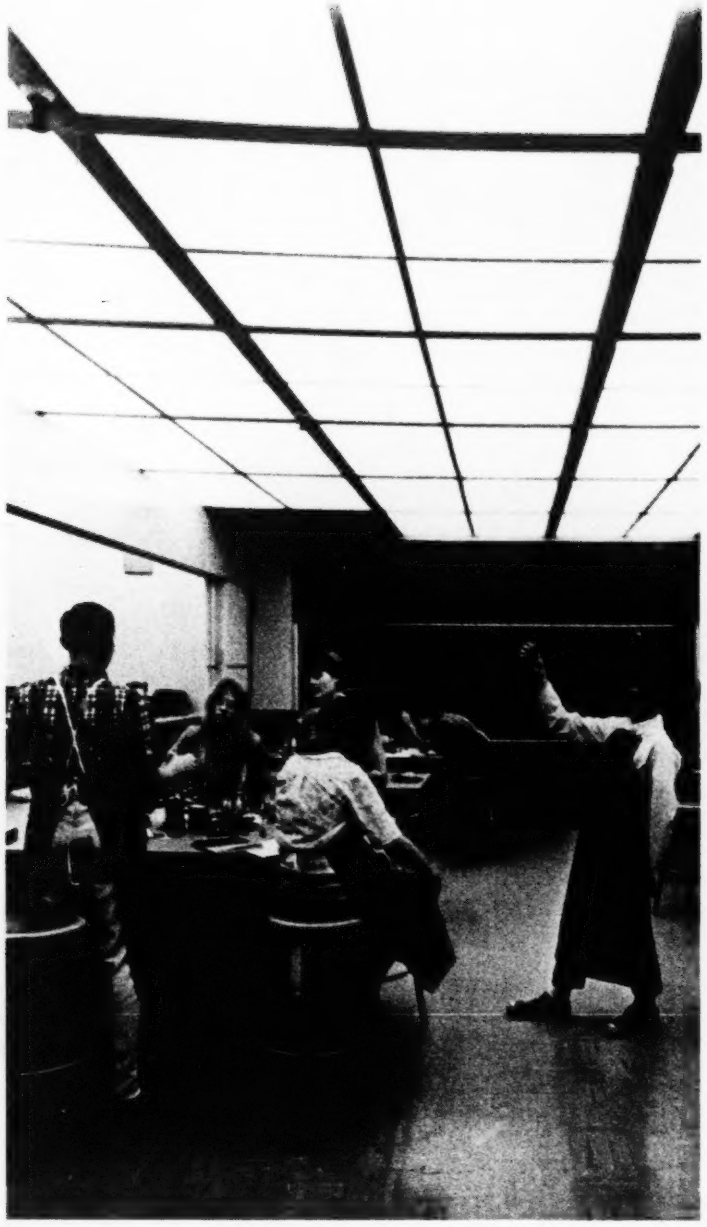
Another problem of high contrast is the fatigue factor the eye suffers from looking at a very abrupt light and dark definition. The eye cannot physically resolve this sudden differential. Faces silhouetted against windows, or white pieces of paper against a dark table top, may even produce a halo effect. The result is discomfort and eye strain if exposure is persistent.

Schools have tended to be very bland visually. The monotonous lack of tonal variation produces its own kind of fatigue, the mental fatigue of boredom and dullness.

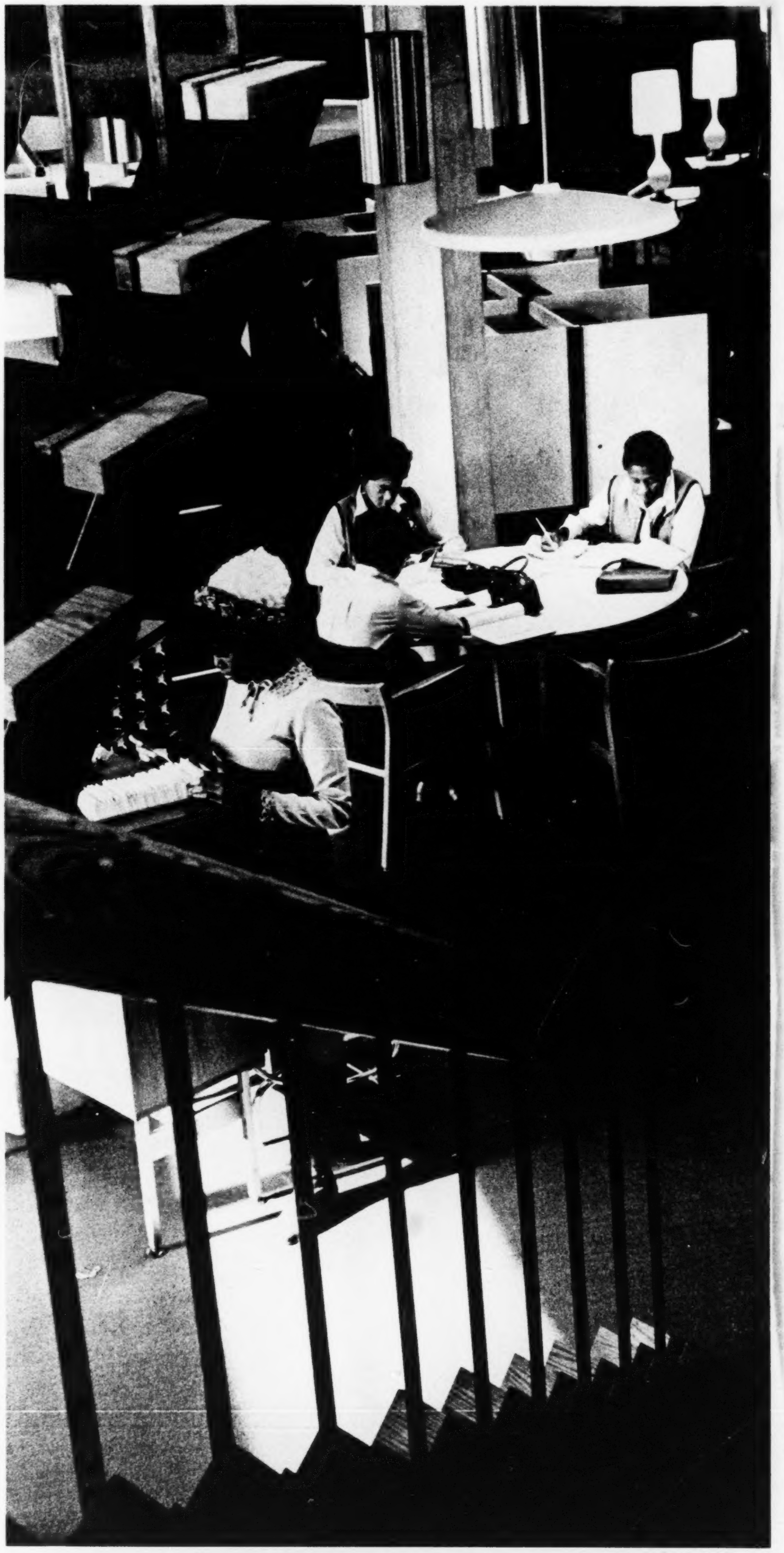
Since lighting is one of the dominant elements that conveys the feeling of what a place is like, it should be used as a special instrument of environmental manipulation. Here are some primary considerations for school lighting.

Tonality In most schools the artificial illumination is almost exclusively via fluorescents and the buildings have tended to be suffused with a spooky greenish effect. This is due to the nature of the tubes that were, until recently, the only kind available. Though incandescent bulbs cast a friendlier light, the schools have opted for the fluorescents because they are more efficient and contribute less unwanted heat gain. These days, however, the newer fluorescent tubes have a more desirable warm spectrum range. Thus, schools now can have fluorescents that combine warm effect and efficiency.

Zonality Lighting should be used to define zones of space. Brightly lit zones have a magnetic effect that draw people toward them and suggest activity. Dimmer areas create the boundaries around them. Light modulated according to zones provides cues as to place, thus providing psychological comfort. To deliver this



Too-prominent ceiling light turns proper focus of interest upside-down.



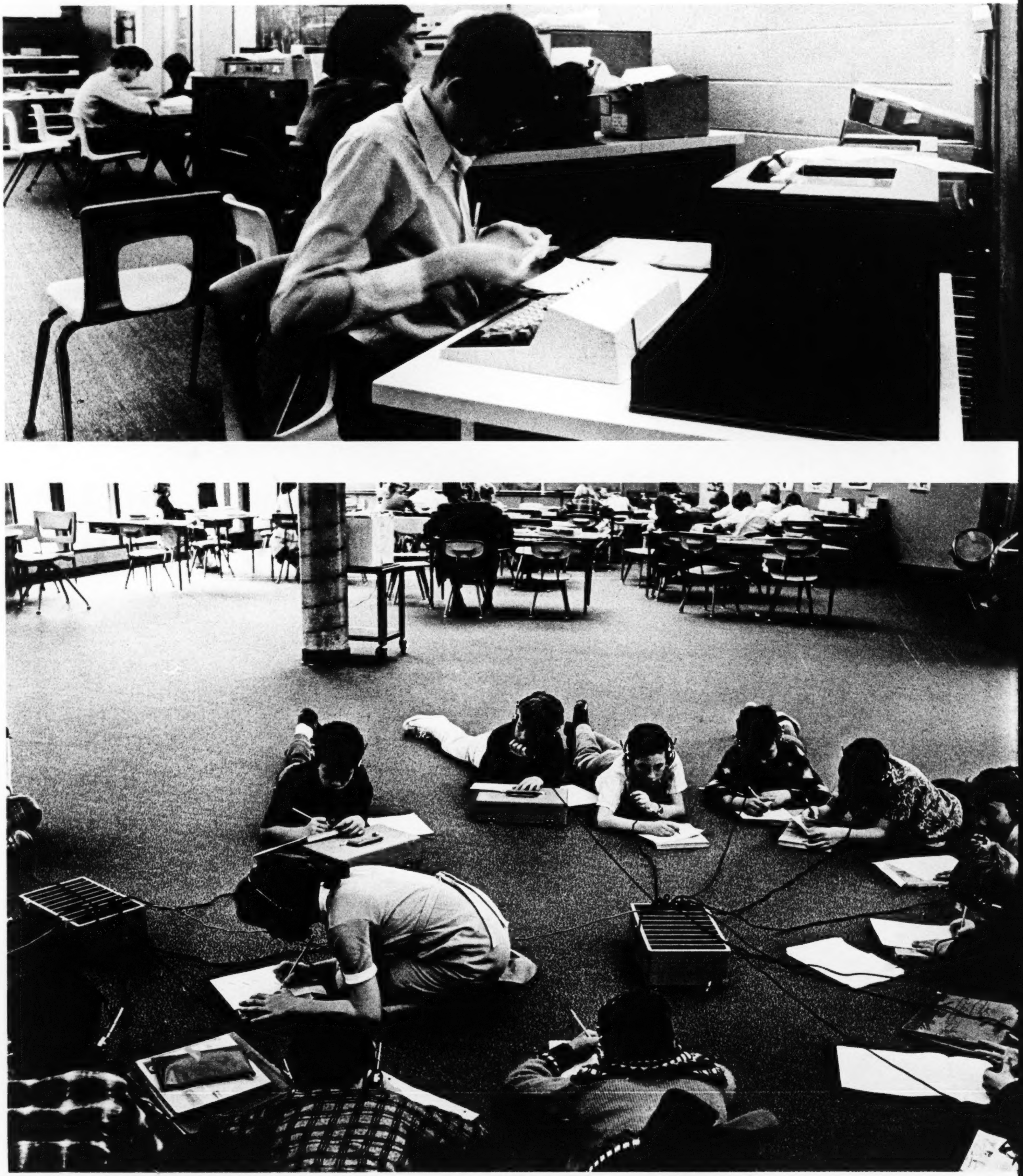
Light sources at various heights reduce institutional quality, make schools more home-like.

ERIC

zonality requires more switches, controls, and relocatability of light sources than is normally provided.

The Source Unrecessed fixtures in the ceiling or unshielded lights are in themselves a problem. The high contrast spots they create upstage the proper focus of attention and, in effect, turn the logic of attention upside down. The proper stage of interest belongs in the lower two-thirds of vertical space. And it is not the light source that should be the central detail, but the over-all effect delivered.

Successful over-all effect requires the introduction of light sources at various heights. Drop lights, desk lights, under shelf lights, are part of the vocabulary that can give blah spaces variation in tone, and identity. Moreover, they give the individual the opportunity for some degree of control over his own micro-surround. And since schools provide few such opportunities, each of them assumes a special significance.



Machines without dedication of space. New energy systems make it possible for machines to serve in random locations. (Top) Computer console in a multi-use math area. (Bottom) Taped individual programs with headsets, in center of open classroom.

B8 Machines And Energy

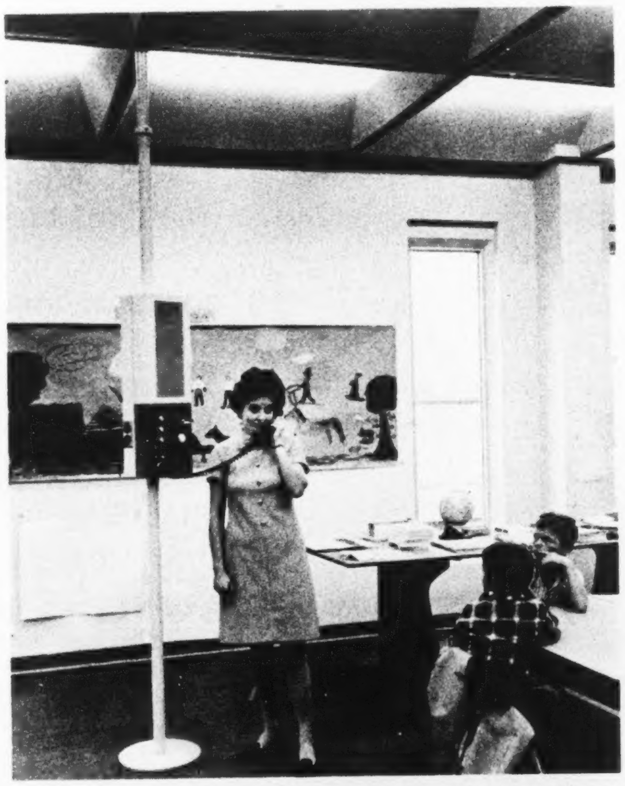
With the entry of more machines into education, their accommodation presents new problems in the commitment of space and service. Moreover, each machine has its own peculiar environmental demands. Does it take power? How much does it weigh? Does it produce heat and how is the heat dissipated? Does it require temperature or humidity control to remain accurate? Does it need to be combined with other machines?

Machine-aided teaching has much potential. But its glamorous aspects may obscure several significant pitfalls. The most serious facility implication lies in the danger of overdedicated space and customized housing for machine concepts that may be very quickly obsoleted by newer and better systems. School decision-makers may be faced with the same galloping technology that moves the U.S. Air Force to say, "If it works, it's obsolete."

There is the second problem of underestimating the subtle human side of the man-machine station. If the place where equipment is to be used is too regimented, too big, too small, or isolated from other human contact, it may be hard indeed to get the student to use it. He well may leave this expensive investment to gather dust. The human factor in machine station design is no job for amateurs.

In the past, using fixed interiors, the power and communication circuits of energy systems could be embedded in walls, floors, and ceilings with limited outlets into rooms. Machines were little used and few changes were anticipated. But if we now are to have frequently renegotiated school interiors, the energy systems will have to change in concept and proficiency.

The new systems needed are more like energy shells surrounding highly variable micro-spaces, ready to deliver service at any random location, at any time.



Ceiling power. Down-delivery system, designed here as an integral sub-system of the total structure, has spring-loaded poles that tap power and communication source through ceiling. Poles can be easily relocated to provide power and communication outlets almost anywhere within the room.

Even in schools without sophisticated distribution systems, band-aid devices can be installed. After this open school was completed, there was a need for additional local power sources. Movable pogo sticks solved problem by tapping into ceiling power.

(B8 Machines And Energy)

Since we are not likely to have the time or the money tediously to sink wiring into walls—which now may not even be there—the time has come to treat wiring itself as a manageable and designed detail. Abundant visible wiring in the contemporary environment is a fact of life.

The portable elements in schools—walls, carrels, machine work stations, carts, etc., have to be designed as wire-managers with the clips, cavities, and open-access raceways to carry and store wiring.

Since a use requirement may occur 50 feet from the nearest wall, it is necessary to have the ceiling or floor deliver to points of use. In considering which it will be, there are several factors to consider.

Floors with adequate raceway density are quite expensive, and penetrating for new locations, and closing and patching abandoned outlets, can be a slow and costly operation in itself. Raised floors with liftable sections allow the quick change of outlets and can deliver to any random location but they tend, so far, to be even more expensive. Moreover, while floor-delivered wiring is less conspicuous, it can also be a hazard to traffic and a nuisance to cleaning.

Wiring delivered down from the ceiling tends to be less expensive and less in the path of floor cleaning or traffic. But unless it is well handled, it can be visually distracting. In installations where it has been integrated with other ceiling functions of lighting and air handling, and where it has had appropriate down delivery hardware, it is proving to be capable and unobtrusive.

Fully integrated energy systems for both floors and ceilings are just now receiving appropriate attention.

3

A Planning: The Key

> **In the past men could shrug their shoulders in the face of most of the evils of life because they were powerless to prevent them. A misfortune like a fish kill could be blamed on God or Fate. Now there is no one to blame but ourselves. Nothing is any longer inevitable. Since everything can be accomplished, everything must be deliberately chosen.**
>
> **Jerome Frank,**
> **"Galloping Technology,**
> **A New Social Disease."**
> ***Journal of Social Issues***

Preparing to live in a complex facility requires planning. We all take that for granted. But the planning process itself has fallen into a routine pattern that obscures the need for new input.

One of our biggest blind spots is failure to recognize that the ultimate responsibility for planning lies with the users themselves. This is not to say that naive or untrained people should design buildings. But it does say that using a building is very much the business of the occupants themselves. It is they who will be living in it—and like it or be at war with it—long after the architects and consultants have gone on to other rewards. It is they who must understand its function, know its weaknesses and potentialities, deliver conclusions about their unique needs and desires, and, as they live in their new surroundings, it is they who will have to make them work. This should not be a haphazard experience in which they discover, too late, unpleasant frozen consequences no one has anticipated or can any longer do anything about.

Planning, then, may be someone's particular responsibility but it is everyone's business. How should it work?

I am not suggesting that works of architectural art are obsolete....(But) we are in the midst of an extremely important shift in emphasis, in the perception and consideration of the critical relationships between a building and its surroundings and the people who use it or are effected by it, with emphasis on effect.

The effect can be salutary or catastrophic; it can even have a chain reaction over a large area. It can help shape or destroy anything from a neighborhood to a society. That makes architecture, correctly understood and practiced, almost frighteningly important. And it is.

Ada Louise Huxtable,
"Anyone Dig the Art of Building?",
The New York Times

A1 Full-Spectrum Planning

Planning frequently proceeds on the assumption that a few school authorities working with a few design professionals can closet themselves and come up with the right building solutions. This ignores two realities.

The first is that no one else knows as well as we do what we need and what we like. Granted, such self-knowledge does not come easily. It requires an examination of our values, goals, and means. In the case of school planning where many different populations must have a voice—administrators, teachers, students, parents, and community members—it may require a synthesis of divergent views. Perhaps school officials have assumed that the laborious self-probing required for such intelligence would produce only naive, narrow information and that, in any case, the professional planners and architects have all the answers. But lack of this input by the user robs planning of its quintessential meaning. Without it, there is the danger of soft retreats to canned conclusions or, conversely, innovation that is little related to the actual world of the user.

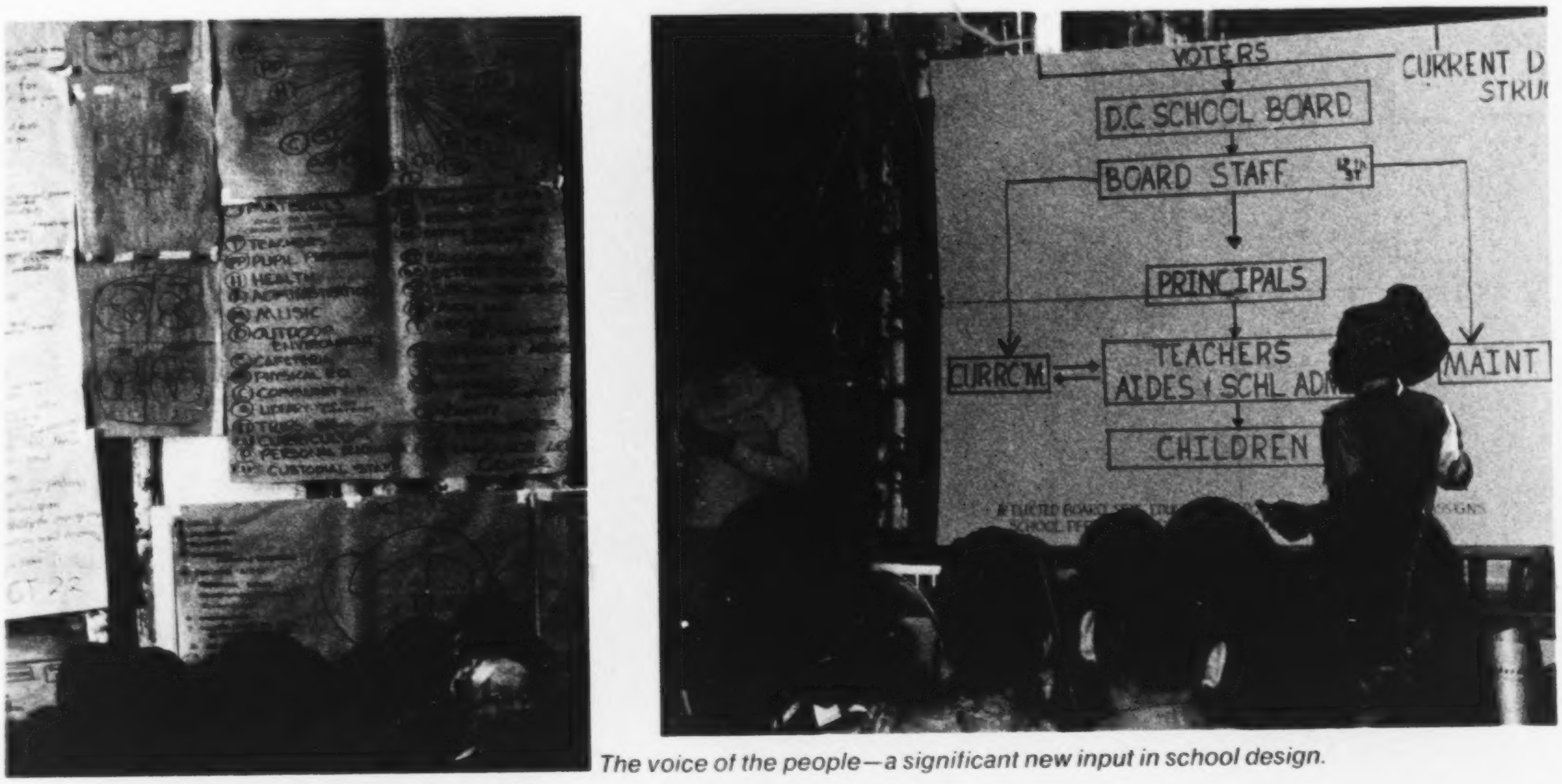
The second reality we ignore is that the new technology in the environmental disciplines could contribute much, if used. It is ironic that many existing facility errors could have been avoided if the new skills waiting in the wings had been consulted. It is like the old saw, "Why, I didn't know you knew that!" with the response, "You never asked."

Many of these recently developed areas of environmental know-how are not yet organized as consulting services. This does not mean they are not usable, but it requires some digging to bring them into the picture. Here are some of the waiting resources, listed in alphabetical order.

A Planning: The Key

(A1 Full-Spectrum Planning)

- Acoustical Design, Engineering
- Audio-visual Design, Engineering
- Behavioral Sciences
- Building Systems Design
- Community and Press Relations
- Ecological Study
- Electronic Data Processing Hardware Specs
- Electronic Data Processing Program Development
- Facilities Use Training
- Financial Planning
- Food Service Planning
- Graphic Design
- Health Care Planning
- Information Management
- Installation Supervision
- Interior Design
- Laboratory Planning, Engineering
- Lighting Design
- Management Consulting
- Project Planning
- Safety Engineering
- Site Planning
- Technical Equipment Specification
- Urban Planning


VOTERS
CURRENT D
STRU
D.C. SCHOOL BOARD
BOARD STAFF
PRINCIPALS
CURRC'M
TEACHERS
AIDES & SCHL ADM
MAINT
CHILDREN

The voice of the people—a significant new input in school design.

Trial runs, made possible by scale model of newly planned interior, enable students and staff at Harlem Prep to study effects of different layouts.

Antioch College in miniature. Manipulating the model brought student designers a step closer to final plans for their new campus at Columbia, Maryland.

A2 Simulation And Gaming

Even with a forgiving system, it is important to know if a new plan will work. A means of facility simulation, a way to play before committing, is necessary.

Physical scale models with manipulable components serve this function. Models have been used as a tool for years by managers of manufacturing plants, as a way to study the effect of reorganizing equipment and services. Today, office facility managers make frequent use of interior models to evaluate the dynamic effect of changes.

Models, if they are accessible to the wide variety of people who will be using a facility, are spectacular idea catalysts. Because every individual can project himself physically into a model (especially if it also has people figures), he quickly identifies with the operative phenomenon. How will it work, how does it feel, where are all the people and services I relate to? Moreover, games can be played and all the cause and effect of changes can be demonstrated, felt, reacted to. Model gaming gives school planners a sense of tangibility and allows experimentation with strategies for optimum use of the facility. It provides a means of visualizing in advance over-all related effects.

A3 On-Line

The hardest new lesson is to recognize that a facility used by a live organization is never finished. *It is never finished.* It is, on the contrary, always in a state of adjustment, growth, and restatement. This is what the living process is all about. The phenomenon of our age is that almost everything planned for our use is obsolete before it reaches our hands. Planning is useless unless it can reach implementation fast enough to serve current needs.

The planning process, then, has to be dominated by the premise that it is a *continuing* function. Issues and their resolution must be very close to one another—in an *on-line* relationship. "On-line," a term which has emerged from the computer world, implies a plug-in to the continuing spectrum of live events in an organization. Its point is to avoid the pitfalls of decision-making based on stale information parked on side tracks. On-line planning is management that marshalls current information to make decisions about change and keeps the physical facility in a posture that can respond. This not only permits desirable variation in day-to-day programming, it permits the accommodation of exceptional events which assuredly happen.

Suppose, for example, budget changes make possible new forms of staffing—or a flu epidemic drastically reduces the student-teacher population for a few weeks—or there is a consolidation of districts—or a public school must suddenly receive the population of a closing parochial school—or a blizzard damages part of a building—or a school wishes to respond to a staggering news event like a moonshot or the death of a public leader and preempt its prearranged schedules to deal with their significance—or there is a wish to experiment with a mode in which students may study one subject exclusively for three week periods. If response is not possible quickly and economically, either it throws the school into chaos or prevents it from making capital of new possibilities and new ideas.

3.1 The Management Team

The techniques for making successful adjustments of these kinds are neither simple nor casual. Giant corporations recognize this and maintain fulltime "facility managers" to do the job. To do it in schools will require a drastic revision in the relationship between the schools as users and the outside professionals. The hit-and-run services of architects, consultants, and other experts who deliver a facility and then disappear from the scene are no longer adequate. Their roles will have to be reconceived in terms of sustained involvement in the organic evolution of the facility. This may be through formal contractual arrangements for sustained service or through informal understanding with the professionals that they will be available.

Whichever way, it will take teams made up of design specialists who learn to think like teachers, and teachers and administrators who learn to think like designers, to make on-line management planning an applied tool in education.

A4 The Fine Art Of Going Somewhere

Industry . . . has the peculiar advantage of understanding the major evil from which our whole educational system is suffering—obsolescence. Modern ideas of obsolescence have come out of studies of industrial processes, and . . . making allowance for the costs of obsolescence and supporting continuing research on problems of obsolescence are a normal part of their (industrialists—ed.) professional behavior.

Margaret Mead,
"Why is Education Obsolete?,"
Harvard Business Review

The need to maintain vigor and survive in the business world has caused its managers to develop a healthy interest in commitment to the future. They spend money to assure that business organizations stay prudently ahead of the game.

As a part of such pre-thinking, business managers long ago learned that they must write off and depreciate investment in facilities and equipment. They know that things grow stale or wear out. Businesses have learned, philosophically and functionally, to make drastic moves —in location, in methods, in services, and even to alter their goals.

The result is that the business world makes a pragmatic, continuous investment in going somewhere. When they have used up, obsoleted, or grown away from the usefulness of a plant or a process, they are already commited in management postures and in financial structure to a next step. They can survive.

The historic absence of this kind of realistic pressure is now a tremendous hazard to public institutions. Their lack of future-oriented management causes them to be continuous casualties of the consequence of change, delivered periodically to the taxpayer's doorstep with only one thing to say. "Bail us out. We didn't think much would happen. We didn't know the future was coming."

A5 Affordability

Technology presents an almost unlimited supermarket of goodies we could add to school facilities. But at the same time we are feeling pain—we cannot buy everything. We can only buy what counts.

As costs inflate, there is pressure to buy even less of the conventional solutions. We may not even go to the supermarket to see what's on the shelves.

To be good facility shoppers we need a form of analysis that will provide a perspective on the value of what we are about to buy. With that, there is a way to judge what we can afford and how to spend our dollars. What follows is a framework that will help the shopper make such an analysis.

The principles of this book provide a value vocabulary. Here are its components, with assigned symbols:

CI	Capital Investment in Plant and Equipment.
YCO	Yearly Cost of Operating School.
BSE	Basic Shell Efficiency.
ISE	Interior Systems Efficiency.
DEP	Dynamics of Educational Programs.
EE	Exceptional Events.
CPA	Cost of Physical Alterations.
CD	Contingency Design.
ODT	Organizational Downtime, Loss of Program Momentum.
LSS	Lost or Underutilized Services and Space.
RC	Response Capability.
VEF	Value Effectiveness of Facility.

All these factors have meaning only if they can be functionally related, to wit:
In any measure of value effectiveness, *Capital Investment* bears the brunt of attention. But while its one-time costs are highly visible, they are essentially less significant than the *Yearly Costs of Operating* a school. A million dollars worth of high school will use another million dollars every 3 years in its operating budget. In the 60-year life of a school building the cost of the building will

be only about 6% of the total cost of operations. Thus, in considering the initial costs of the building, emphasis must be placed on whether or not the facility renders school operations effective and efficient.

The efficiency potential of a building consists of two elements: the basic building shell and the interior systems. While the *Basic Shell* is a major element, it has to be viewed in terms of its ability to provide uninhibited use of the *Interior Systems.* If these are at cross-purposes or in a lock-up, the building will deliver very low efficiency. In buildings of traditional design, a greater portion of the construction cost is expended on the shell, with the fixed interior installations costing less. In contrast, open plan buildings—(whether constructed by conventional means or by the newer industrialized building techniques)—tend to deliver lower cost shells. But their interiors cost more as they invest in flexibility: in space modulation, and in responsive power and communication circuitry systems. With an equal start-up cost, the open-interior building potentially delivers better operating efficiency.

However, commitment to flexibility in itself means very little unless it is applied to on-line demands. In a school, responsiveness of the facility is required for two central reasons. One is the natural and continuing pressures of a *Dynamic Education Program* (DEP). In a practical sense, for example, waiting for the end of the school year to effect a program change is a major inhibition.

The second reason why responsiveness is essential is the high probability that unexpected *Exceptional Events* (EE) *will* happen in any school. As discussed in the "on-line" section, they are major impacts that cannot be pre-programmed. They happen and they must be accommodated.

The school facility reacting to a change tests a number of performance factors, i.e.: the direct *Cost of Physical Alteration* of the school (CPA), whether or not *Contingency Design* (CD) built into a facility will accommodate the events, whether *Space* and *Service* will be lost or underutilized (LSS), and whether school programs and personnel will lose momentum and direction while the *facility is down* for change (ODT). The relationship of these factors to the efficiency of the *Building Shell* (BSE) plus the efficiency of the *Interior Systems* (ISE) measures the *Response Capability* (RC) of the plant, as demonstrated in this formula.

$$\frac{\mathrm{BSE}+\mathrm{ISE}}{\mathrm{CPA}+\mathrm{CD}+\mathrm{LSS}+\mathrm{ODT}}=\mathrm{RC}$$

Building shells with flexible interior systems can deliver a high response capability. Their teaching spaces can be readjusted overnight. The costs per square foot for moving furniture, divider panels, and the like—building contents rather than building elements—are likely to be less than 50¢ per square foot using in-house labor, as compared to $6 to $9 per square foot for alteration of conventional walls. Since an interior with options naturally provides a matching of services and equipment to needs, there is little investment necessary for contingency design in the form of pre-committed fixtures. The same thing is true of space. Because it is negotiable, space is user-fitted, right in size, shape, and location.

The downtime problem imposes another inhibition if very much time is required for change. Outside crews in the school, dust and confusion, and loss of use of the space and equipment, cannot be reasonably incorporated in institutions that have to run every day. On the other hand, if the user himself can change the environment in minutes or hours without outside help, downtime disappears.

Since the effect of *Dynamic Educational Programs* (DEP) and *Exceptional Events* (EE) bears on all schools rather evenly, the most important variable to judge is how well a building can react, or its *Response Capability* (RC). This in the end, measures the *Value Effectiveness* of the *Facility* (VEF).

$$(\mathrm{DEP}+\mathrm{EE}) \times \mathrm{RC}=\mathrm{VEF}$$

In sum, the initial cost of a flexible building is about the same as the cost of a conventional school. But the payoff is in the school that will respond to the demands of day to day programs—an operational payoff.

We so often react to "newness" and "improvement" with, "Sure, that's great but who can afford it?" that we don't see that, in fact, we *can* afford it. A careful roundup and weighing of the factors speaks for itself. What they point to is that if you are going to build at all, not only can you afford a value-loaded environment, but it will cost you less.

A6 The Change Agent Function

It is hard to find the person who isn't interested in improvement, in a better way of life. But who leads the decision to change?

The initiation of change is in itself a process in society dominated by an irreplaceable minority, the change agents. Change agents are those individuals who have a kind of venturesome self-confidence. They can and do try new things. This small group of idea-testers, in turn, is watched closely by the majority. Once they adopt and endorse a new value, there is often rapid acceptance by others.

Every community and organization has its change agents. You, the reader of this book, whether you are a superintendent, principal, teacher, student, parent, or concerned citizen, are a potential change agent. And though you may never before have been involved in the planning of a school facility, the role you can play in reversing exhausted patterns, in creating schools that are innovative and humane, is a pivotal one. Schools *can* be places where people would like to be even if they didn't have to be in them. Without your opinionated voice, the shaping of our schools falls by default into the hands of the status quo players.

One of the things organizations are good at is perpetuating themselves. If you ask an organization what it really wants, it will almost invariably tell you it needs something it's already good at. People don't want what they say they want, and we're trying to change organizations to fit what people tell us they want. When you try to change institutions, it's like kicking a big mountain of mashed potatoes.

Richard E. Farson,
"The Greatest Realization,"
Environment/Planning & Design

B The Value Conclusions

A school facility is a complex enterprise. Even with the best planning the result will always be less than perfect. In any case, the dynamics of life within it will inevitably frustrate notions of perfection. But whatever its flaws, if the planners who are giving it shape stay in touch with their bedrock values, it will not fall short of the true mark. Those values can be summed up in three questions:

> **Will the schoolhouse be a humane place?**
> **Will it nurture the educative process?**
> **Can it accommodate the future?**

We are reminded here of Antaeus, the marvellous wrestler of Greek legend, who was virtually invincible. His great strength was derived from his mother, the Earth, and so long as he stayed close to the Earth his powers were renewed. It was only when Hercules held him in the air, breaking his bond with the ground, that he was vanquished. In like manner, planners who are grounded to the above considerations and hold fast to them, cannot help but produce schools of enduring intrinsic worth.

Publications

The following publications are available from EFL, 477 Madison Avenue, New York, N.Y. 10022.

BRICKS AND MORTARBOARDS. A guide for the decision-makers in higher education: how the colleges and universities can provide enough space for mushrooming enrollments; how the space can be made adaptable to the inevitable changes in the educational process in the decades ahead. (1964) $2.00

SCSD: THE PROJECT AND THE SCHOOLS. A second report on the project to develop a school building system for a consortium of 13 California school districts. (1967) $2.00

DESIGN FOR ETV—PLANNING FOR SCHOOLS WITH TELEVISION. A report on facilities, present and future, needed to accommodate instructional television and other new educational programs. Prepared for EFL by Dave Chapman, Inc., Industrial Design. (1960) (Revised 1968) $2.00

EDUCATIONAL CHANGE AND ARCHITECTURAL CONSEQUENCES. A report on school design that reviews the wide choice of options available to those concerned with planning new facilities or updating old ones. (1968) $200

SCHOOLS FOR EARLY CHILDHOOD. Ten examples of new and remodeled facilities for early childhood education. (1970) $2.00

SYSTEMS: AN APPROACH TO SCHOOL CONSTRUCTION. Toronto, Montreal, and Florida projects and how they developed from the SCSD program. (1971) $2.00

GUIDE TO ALTERNATIVES FOR FINANCING SCHOOL BUILDINGS. Chart and book explores conventional and unconventional routes for financing school construction. Includes case histories. (1971) $2.00

PATTERNS FOR DESIGNING CHILDREN'S CENTERS. A book for people planning to operate children's centers. It summarizes all the design issues involved in a project. (1971) $2.00

SCHOOLS: MORE SPACE/LESS MONEY. Surveys the alternatives for providing school spaces in the most economical manner. Includes extending school year, converting spaces, sharing facilities, open campus, etc. (1971) $2.00

A COLLEGE IN THE CITY: AN ALTERNATIVE. A report of a new approach to the planning of urban campuses with facilities dispersed through the community, designed to serve community needs and to stimulate community redevelopment. (1969) $1.50

COLLEGE STUDENTS LIVE HERE. A report on the what, why, and how of college housing; reviews the factors involved in planning, building, and financing student residences. (1962) $1.25

THE SCHOOL LIBRARY: FACILITIES FOR INDEPENDENT STUDY IN THE SECONDARY SCHOOL. A report on facilities for independent study, with standards for the size of collections, seating capacity, and the nature of materials to be incorporated. (1963) $1.25

EXPERIMENT IN PLANNING AN URBAN HIGH SCHOOL: THE BALTIMORE CHARETTE. A two-week meeting enabled community people to tell educators and planners what they expect of a school in a ghetto. (1969) $1.00

JOINT OCCUPANCY. How schools can save money by sharing sites or buildings with housing or commerce. (1970) $1.00

AIR STRUCTURES FOR SCHOOL SPORTS. A study of air-supported shelters as housing for playfields, swimming pools, and other physical education activities. (1964) $0.75

SCHOOL SCHEDULING BY COMPUTER/ THE STORY OF *GASP*. A report of the computer program developed by MIT to help colleges and high schools construct their complex master schedules. (1964) $0.75

THE HIGH SCHOOL AUDITORIUM: SIX DESIGNS FOR RENEWAL. Renovation of little-used auditoriums in old and middle-aged schools to accommodate contemporary educational, dramatic, and music programs. (1967) $0.75

MIDDLE SCHOOLS—controversy and experiment. (1965) $0.50

SCHOOLS WITHOUT WALLS—open space and how it works. (1965) $0.50

THE SCHOOLHOUSE IN THE CITY. An essay on how the cities are designing and redesigning their schoolhouses to meet the problems of real estate costs, population shifts, segregation, poverty, and ignorance. (1966) $0.50

THE IMPACT OF TECHNOLOGY ON THE LIBRARY BUILDING. A position paper reporting an EFL conference on this subject. (1967) $0.50

THREE HIGH SHCOOLS REVISITED: Andrews, McPherson, and Nova. (1967) $0.50

CAMPUS IN THE CITY. An essay on the physical problems and trends in planning of urban colleges and universities and their potential role as a catalyst in the remaking of the cities. (1969) $0.50

DESIGN FOR PAPERBACKS: A HOW-TO REPORT ON FURNITURE FOR FINGERTIP ACCESS. Physical solutions to the problems of displaying paperback books for easy use in schools. (1968) $0.50

ON THE WAY TO WORK—five vocationally oriented schools. (1969) $0.50

THE EARLY LEARNING CENTER. A Stamford, Conn. school built with a modular construction system provides an ideal environment for early childhood education. (1970) $0.50

AN INVESTIGATION OF COSTS OF INEXPENSIVE ENCLOSURES FOR RECREATIONAL AREAS. Analyzes construction and operating costs for seven types of structures. (1969) Free

TRANSFORMATION OF THE SCHOOLHOUSE. A report on educational innovations in the schoolhouse during the last decade, with financial data for the year 1968. Free

AIRCONDITIONING FOR SCHOOLS. Cooler schools make better learning environments. (1971) Single copies free, multiple copies $0.25

PLACES FOR ENVIRONMENTAL EDUCATION. Identifies types of facilities needed to improve environmental education. (1971) Single copies free, multiple copies $0.25

Technical Reports

2 TOTAL ENERGY. On-site electric power generation for schools and colleges, employing a single energy source to provide light, heat, airconditioning, and hot water. (1967) $1.25

3 20 MILLION FOR LUNCH. A primer to aid school administrators in planning and evaluating school food service programs. (1968) $1.25

4 CONTRAST RENDITION IN SCHOOL LIGHTING. A discussion of requirements for school lighting, with 18 case studies. (1970) $1.25

5 INSTRUCTIONAL HARDWARE: A GUIDE TO ARCHITECTURAL REQUIREMENTS. (1970) $1.25

Newsletters

COLLEGE NEWSLETTER

A periodical on design questions for colleges and universities. Free

NEW LIFE FOR OLD SCHOOLS.

A periodical of case studies about renovating existing school facilities. Free

SCHOOLHOUSE.

A periodical on financing, planning, designing, and renovating school facilities. Free

Credits

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P. 38 Clear Creek Secondary School, Idaho Springs, Colorado. Nixon, Brown, Brokaw, Bowen, architects. Photo by Rush J. McCoy

P. 40 Photo by George Zimbel

P. 41 (top to bottom) Beachwood Middle School, Beachwood, Ohio. Philmore J. Hart, architect. Photo by Frank V. Carioti/Photo by Frank V. Carioti/North Kingstown High School addition, North Kingstown, Rhode Island. Research and Design Institute, interior design. Photo by Frank V. Carioti/Estancia High School, Costa Mesa, California. Wm. E. Blurock and Associates, architects. Photo by Frank V. Carioti

P. 42 (top) Photo by George Zimbel/(bottom) Mariemont High School, Mariemont City School District, Cincinnati, Ohio. Baxter, Hodell, Donnely & Preston, architects. Photo courtesy of school

P. 44 St. Louis Priory School, St. Louis County, Missouri. Hellmuth, Obata and Kassabaum, Inc., architects; Michael D. Tatum and L. Dean Smith, designers of unit. Photo courtesy of architects

P. 46 (top) Photo by George Zimbel/(bottom) Photo by Rondal Partridge

P. 48 (top) Photos by Rondal Partridge/(bottom) Beachwood Middle School, Beachwood, Ohio. Philmore J. Hart, architect. Photo by Frank V. Carioti

P. 50-51 (all photos) Clear Creek Secondary School, Idaho Springs, Colorado. Nixon, Brown, Brokaw, Bowen, architects. Photos by Rush J. McCoy

P. 52 (top) Photo by Bill Stumpf/(bottom) Photo by Rondal Partridge

P. 54 (top) Estancia High School, Costa Mesa, California. Wm. E. Blurock and Associates, architects. Photo by Frank V. Carioti/(middle) North Kingstown High School addition, North Kingstown, Rhode Island. The Providence Partnership, architects. Photo by Frank V. Carioti/(bottom) Little Falls High School, Little Falls, New York. Warren H. Ashley, architect. Photo by Frank V. Carioti

P. 55 Clear Creek Secondary School, Idaho Springs, Colorado. Nixon, Brown, Brokaw, architects

P. 56 (top) South Shore High School, Chicago, Illinois. Fridstein and Fitch, architects. Photo by Frank V. Carioti/(bottom) George Syme Public School, Toronto, Canada. P. Allward—Allward & Gouinlock, architects. Photo by George Zimbel

P. 58 Photo by George Zimbel

P. 59 Clear Creek Secondary School, Idaho Springs, Colorado. Nixon, Brown, Brokaw, architects

P. 61 Chicago Metro High School, Chicago, Illinois. Photos by Frank V. Carioti

P. 62 Clinton Youth and Family Center, New York City. J. Stewart Polshek Associates and Walfredo Toscanini, architects. (3 top) Photos by George Zimbel/Harlem Preparatory School, New York City. (bottom left) Photo by George Zimbel. (bottom right) Photo by J. Lion Weinstock

P. 68 Sidney Elementary School, Sidney, New York. Warren H. Ashley, architect. Photo by Robert L. Nay

P. 70 Mariemont High School, Mariemont City School District, Cincinnati, Ohio. Baxter, Hodell, Donnely & Preston, architects. Photo courtesy of school

P. 71 (top) Harlem Preparatory School, New York City. Photo by George Zimbel/(bottom) Kearsarge Regional High School, Sutton, New Hampshire. Warren H. Ashley, architect. Photo by Frank V. Carioti

P. 72 (top left) Kearsarge Regional High School, Sutton, New Hampshire. Warren H. Ashley, architect. Photo by Frank V. Carioti/(top right) Port of New York Authority, New York City. Gordon Lorimer, Chief architect, Roger Carroll, designer. Photo by George Zimbel/(bottom) Ernestine Matzke Elementary School, Houston, Texas. Wilson, Morris, Crain & Anderson, architects. Photo by George Zimbel

P. 73-74 Clear Creek Secondary School, Idaho Springs, Colorado. Nixon, Brown, Brokaw, Bowen, architects. Photo by Rush J. McCoy

P. 76 (top) Clear Creek Secondary School, Idaho Springs, Colorado. Nixon, Brown, Brokaw, Bowen, architects. Photo by George Zimbel/(bottom) Harlem Preparatory School, New York City. Photo by George Zimbel

P. 79 Clear Creek Secondary School, Idaho Springs, Colorado. Nixon, Brown, Brokaw, Bowen, architects. Photo by Rush J. McCoy

P. 80 Zion Heights Junior High School, Ontario, Canada. James A. Murray, architect. Photo by George Zimbel

P. 81 Clear Creek Secondary School, Idaho Springs, Colorado. Nixon, Brown, Brokaw, Bowen, architects. Photo by George Zimbel

P. 82 Barlow School, Amenia, New York. Der Scutt, architect. Photo courtesy of school

P. 87 Photo by George Zimbel

P. 88 (top left) Beachwood Middle School, Beachwood, Ohio. Philmore J. Hart, architect. Photo by Frank V. Carioti/(top right) North Kingstown High School addition, North Kingstown, Rhode Island. The Providence Partnership, architects. Photo by Frank V. Carioti/(bottom) Clear Creek Secondary School, Idaho Springs, Colorado. Nixon, Brown, Brokaw, Bowen, architects. Photo by Rush J. McCoy

P. 92 Photos by George Zimbel

P. 95 Photos by Frank V. Carioti

P. 96 (top) Cottonwood High School, Granite School District, Salt Lake City, Utah. Edward & Daniels & Associates, architects. Photo by Frank V. Carioti/(bottom) Steuart Hill Elementary School, Baltimore, Maryland. Tatar & Kelly, Inc., architects. Photo by George Zimbel

P. 98 (left) Photo by Rondal Partridge/(right) South Shore High School, Chicago, Illinois. Fridstein and Fitch, architects. Photo by George Zimbel

P. 100 (top) Mariemont High School, Mariemont City School District, Cincinnati, Ohio. Baxter, Hodell, Donnely & Preston, architects. Photo courtesy of school/(bottom) Granada Community School, Belvedere-Tiburon, California. Callister & Rosse, architects. Photo by Rondal Partridge

P. 102 (top) Eastview Public School, addition No. 3, West Hill, Ontario. P. D. J. Tirion, architect. Photo by George Zimbel/(bottom) Kirk Road Elementary School, Greece, New York. Faragher & Macomber, architects. Photo by George Zimbel

P. 107 Photos courtesy of United States Office of Education

P. 108 (top) Harlem Preparatory School, New York City/(bottom) Antioch College, Columbia, Maryland

EFL

Space That Breathes
The Additive Environment
The Sitting Business
Grace With Change
To Be Forgiving
The Social Arena
That Territorial Feeling
Old Culture or New Culture
Privacy vs. Involvement
Geometry vs. Humanism
Child Place or Adult Place
Space That Breathes
The Additive Environment
The Sitting Business
Grace With Change
To Be Forgiving